

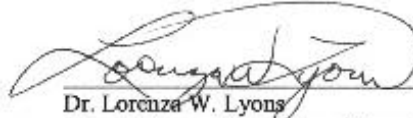
**Virginia Tech and Virginia State University
Agricultural Research and Extension
Plan of Work**

Certification

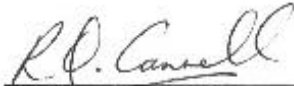
The following is the Virginia 5-year Plan of Work. The Plan of Work covers the period October 1, 1999 through September 30, 2004, with the option to submit annual updates. The Plan of Work includes the Agricultural Research and Extension programs at Virginia Tech and Virginia State University.



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Introduction

Virginia's AREERA Plan of Work covers the period of October 1, 1999 through September 30, 2004. If significant changes in programming or structure occur during the period of time covered by the Plan, Virginia will submit one or more annual updates, as appropriate.

The Plan of Work for Virginia consists of one consolidated plan covering both research and extension programs and both the 1862 (Virginia Tech) and the 1890 (Virginia State) institutions. This total submission of Virginia's AREERA Plan of Work includes all state appropriated and federal formula funds. Extension and research were combined into one agency at Virginia Tech by the Virginia General Assembly in 1994 and were combined at Virginia State University by action of the Virginia General Assembly in 1999. Virginia Tech and Virginia State have been operating as one extension service since 1964. Research at both institutions has been conducted in a cooperative manner for many years.

The table below illustrates the national goals for which programs in extension and research at both universities are planned and conducted. The 1890 university does not participate in Goal 2 nor in the research programs for Goals 3 and 5. The 1862 partner participates in all five goals.

	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5
1862 AES	X	X	X	X	X
1862 CES	X	X	X	X	X
1890 AES	X			X	
1890 CES	X		X	X	X

Virginia has included preliminary information on multi-state activities later in this Plan of Work as examples of on-going integrated research and extension work. Since specific guidelines on Sections 105 and 204 have not yet been distributed, a full response to these items cannot be included. A member of Virginia's administrative staff is participating on the committee that is working to resolve issues surrounding Sections 105 and 204. Virginia will amend its plan as instructed by CSREES, when the guidelines are finalized. While Virginia has numerous collaborative projects with other states, few efforts have been made to formalize these working agreements nor to account for specific costs associated with these projects since prior regulations did not require strict documentation.

1862/1890 Relationship

From 1890 until 1964, Cooperative Extension in Virginia was divided along racial lines. The 1890 extension program was first placed at Hampton Institute, but, in 1920, the 1890 designation was moved to Virginia State University. The 1890 program served African-American Virginians through an agent and specialist staff at the historically black university. The 1862 program served white Virginians through an agent and specialist staff housed at Virginia Tech.

When the Civil Rights Act of 1964 was passed, Virginia Cooperative Extension combined the previously segregated field staff and programs at the two universities into a single system. Virginia Tech payrolls all extension agents; however, specialists, administrators, and support staff are payrolled by each home university. Virginia Tech handles federal benefits for eligible employees at both universities, Virginia Tech provides the federal penalty mail allocations to Virginia State, Virginia State provides office space on its campus for one of the six extension district directors and staff, and Virginia State has been included in the Virginia Tech information technology initiatives including access to its computer network since its inception. Both institutions jointly plan and report on programs for the state and federal partners.

Virginia Cooperative Extension (VCE) continues as a joint program of both universities, which have a memorandum of understanding outlining their working relationship. The two institutions work cooperatively on educational programs and avoid duplicating each other's work. State and federal funds are appropriated directly to each university. Since Virginia State, by agreement, has no resident extension agent staff, local government funds to support agents' work are paid to Virginia Tech. Virginia State does have paraprofessionals in several localities throughout the Commonwealth. Specialists at both universities work cooperatively on educational programs, and researchers support each other's efforts to conduct relevant research which is non-duplicative.

As part of the joint extension program, both the Director of VCE at Virginia Tech and the Administrator of VCE at Virginia State give leadership to Virginia Cooperative Extension. The administrative leadership groups at both universities meet jointly on a regularly scheduled basis to conduct the business of the organization. The 1862 and 1890 Directors of the Agricultural Experiment Stations meet and talk on a frequent basis to coordinate research efforts.

Matching Funds 1862/1890

Virginia has met or exceeded the required match for federal funds for the 1862 university for many years. In 1998, Virginia matched 43% of the 1890 federal appropriation. In 1999, the

Governor pledged and the General Assembly upheld 100% matching funds for the 1890 university to be phased in over three years, resulting in full matching of 1890 federal funds by the year 2002. This full matching will enable even greater leverage of formula funds in the future.

The relationship between Virginia State and Virginia Tech in fulfilling extension and research programs has persisted over decades and, rather than compete with each other, the two universities have found specific roles which each is best suited to fulfill. The faculty at both universities carry out their programs working through one group of extension agents in the counties and cities. This arrangement has enabled the citizens to receive the assistance they need without regard to which of the two universities happens to hold the needed expertise.

The 1862/1890 partnership continues to strengthen each year. The original memorandum of understanding called for plans of work jointly coordinated and carried out by the two universities, organizational structures designed to promote the concept of a unified program, and conferences between the director and administrator to ensure unity of effort. The concepts that gave strength to the original plan continue in force today. The citizens of Virginia are enriched by the educational programs led by both universities and are further enriched by the joint VCE program and cooperative research relationship emphasized by Virginia State and Virginia Tech.

Integrated Research and Extension

In 1994, the Virginia General Assembly approved a joint division at Virginia Tech known as the Virginia Cooperative Extension/Virginia Agricultural Experiment Station (VCE/VAES) Division. Prior to 1994, each of the two components comprised its own separate division within the university structure. While efforts to cooperate are not new to research and extension at Virginia Tech, the official combining of these two entities into the VCE/VAES Division has brought renewed strength to the cooperative arrangement. The research and extension philosophy is deep-rooted in the Division as many faculty on campus and at the Agricultural Research and Extension Centers hold joint research/extension academic appointments. This assures an essential two-way dialogue between research and extension activities.

After combining into one university division, the VCE/VAES Division developed the following joint mission statement that relates specifically to its goals and the duties as described in the Code of Virginia:

“Through research and extension, the Division will address critical issues of food and fiber production, processing, and distribution; human and animal health; enhanced environmental and

natural resource protection, and improved quality of life for youth, individuals, families, and communities.”

In 1999, the Virginia General Assembly voted to approve Virginia State University’s request to form a single division at VSU comprised of the extension and research programs. At the present time, work is underway to fulfill the intentions for the new division, which became official July 1, 1999.

The VCE/VAES Division’s programs, as integral parts of the land-grant university mission, serve all residents of the Commonwealth - rural, suburban, and metropolitan, including underserved audiences and small farm operators. In 1997, VCE placed twenty-two public access computer stations in local extension offices so that the underserved, who typically have limited or no access to technology, could come to the local office and access the internet. VCE/VAES’s programs “put knowledge to work” by providing the people of Virginia with research-based knowledge to solve their problems and meet their needs for economic viability.

Target Audiences

The VCE/VAES Division serves the customers listed below.

Customer	Rationale	Customer Expectation	Monitoring & Evaluation
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1. Farmers/ producers/ land owners and homeowners in rural and urban areas of Virginia.	Farmers/producers/ land owners are direct beneficiaries of new developments and technology in agriculture, forestry, and natural resources. Working with homeowners, natural resources can be protected by teaching proper methods to reduce pesticide and other chemical useage, protect the environment, and improve water quality. Virginia's abundant natural resources must be protected for future generations.	The knowledge source from which up-to-date information and recommendations are developed to address current issues and problems in a timely manner. Increase and improve the availability of information and education through information technology.	Faculty maintain regular contact with farmers, producers, and land owners, both individually and through commodity organizations. Advisory committees for various units within CE/AES include growers/producers/homeow ners as members to assure awareness of needs and evaluation of progress. Programs are evaluated using measurable indicators, such as number of farmers participating in a program or implementing changes in management practices. Continuous improvements are made in the materials available on the Internet.
2. 4-H/Youth	Addresses the original mission of serving youth and supplements public education to meet the Standards of Learning.	Learn skills by completing projects through community clubs and school-based programs, and 4-H camping.	Evaluation based on measurable indicators, such as number of youth who complete a project or number who participate in an activity such as camping.

Customer	Rationale	Customer Expectation	Monitoring & Evaluation
3. Agribusiness and Other Private Industry (small and large companies)	<p>Small companies have no research base; large companies contract out their research with AES; maintains breadth of research programs.</p> <p>New technology can be delivered to the end user via private industry.</p>	<p>Funded projects completed on time and within budget; mutual agreement regarding confidentiality of data during and immediately after testing.</p> <p>Small businesses, such as sawmills, require assistance from the university because they are unable to afford in-house expertise.</p>	<p>Periodic reporting of research progress; site inspections; professional worker field days, seminars, and workshops.</p> <p>Peer review of results.</p> <p>Participant feedback.</p>
4. General Public	<p>All Virginians benefit from the agency's research and extension activities through the safe and abundant food/fiber supply and a clean environment, which are the primary results of its programs.</p> <p>Local Extension offices deliver research-based education that is relevant to the needs of all residents, including public health/safety issues, such as radon detection and skin cancer prevention, nutrition education, and public safety.</p>	<p>Research to be readily available through extension programs to provide a safe and healthy environment and inexpensive sources of food, clothing, and housing.</p> <p>A reliable source of unbiased solutions to everyday problems which arise at home or at the workplace.</p> <p>Continuing advancements in materials and programs available through information technology.</p>	<p>Issues, emerging needs, and programs will be assessed by local Extension staff in concert with Extension Leadership Councils.</p> <p>Continued emphasis on improvements in the number and quality of educational materials and programs delivered electronically.</p>

Customer	Rationale	Customer Expectation	Monitoring & Evaluation
5. Families with emphasis on low-income, welfare, and the single parent	Original mission of home economics as an integral part of extension; saves tax dollars, and develops human resources which ultimately contribute to economic development.	Research-based educational programming which deals with contemporary family issues, including but not limited to, single parenting, coping with underemployment and layoffs, welfare survival, family financial management with minimal resources, and nutrition and health with minimal resources. Timely delivery of up-to-date educational programming.	Specialist, agent, and administrator review using measurable indicators of programming outcomes. Needs assessment-based indicators administered in a pre-/post-test manner. Involve Extension Leadership Councils in determining programs as well as delivering and evaluating programs.
6. Commodity Groups, Boards, and Assocs.	Growers and producers are largely organized into commodity organizations that provide input and funding into the research and development process.	CE/AES programs which are responsive to the needs of the growers and producers. Funded research completed on time and within budget.	Administrators and faculty maintain regular contact with commodity groups, attending and speaking at the meetings. Funded research provides annual reports of results. Hold public field meetings to display research plots and demonstrate new findings. Involve customer in planning and evaluating programs.
7. State Agencies	Various state agencies depend on technology and educational updates developed by CE/AES.	New research results and technology. Training to staff in certain state agencies.	Periodic meetings between faculty and state agency personnel on specific projects to supervise monitoring of progress in achieving objectives; regular reporting of progress.

8. VCE Extension Leadership Council, 106 Local Councils, Leadership Councils for each of the 4 colleges, ANR Leadership Council, FCS Leadership Council, 4-H Leadership Council	Identify and prioritize local issues that can be addressed by VAES/VCE.	Membership to be representative of county or city populations by involving citizen members. Membership also includes representatives of other agencies, organizations and governmental entities.	Periodic self assessments. Assist in determining and evaluating Extension and Research programs.
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Customer	Rationale	Customer Expectation	Monitoring & Evaluation
9. Health Professionals	Veterinary medical faculty provide secondary referral support to the state's practicing veterinarians and other health professionals such as regional laboratory personnel. Nutritionists provide information about human requirements and eating behaviors.	Expertise and education in diagnosis, treatment, disease prevention and animal health. The most current knowledge about nutrition science.	Direct feedback from the referring veterinarian, laboratory or producer; review by federal agencies Direct feedback from health professionals and agencies
10. Federal Agencies	USDA-CSREES provides the operational mandate for the AES; various federal agencies provide competitive research grants.	Compliance with federal mandates maintaining an AES research project system; granting agencies expect annual progress towards research objectives and completion of research on time and within budget.	Peer review of research proposals, at least annual reporting of progress, site visitations by sponsors. Compliance with AREER.

11. Secondary School Agriculture Teachers K-12 Teachers	Agriculture teachers need information on current issues and research results. All teachers need research results and current information to assist them in meeting Standards of Learning and other student needs.	Learn state-of-the-art knowledge, e.g., through workshops and other continuing education.	Feedback from participant
12.Students	Many of the faculty who teach in the four colleges supported by Agency 229 have joint teaching and research appointments.	State-of-the-art knowledge; how research contributes to knowledge; and involvement in research activities.	Evaluation by students and faculty peers. Job placement of students after graduation.

Multi-County Cooperation

Extension agent faculty have offices throughout the state in individual extension units. All agents have generalist responsibilities that are fairly common to all and represent a relatively stable body of research-based extension knowledge. Agriculture and natural resources (ANR) agents and family and consumer sciences (FCS) agents also have a designated specialization assignment that they conduct through multi-county programming. With recent declines in agent positions and the increasing complexities of their subject matter, agents are expected to specialize in a designated field of study and to focus their programs primarily in this specialization. These agents normally conduct their specialty work over a geographic area covering one planning district that may be composed of three to seven counties. Virginia's 4-H agents work in only one county or city because 4-H participants, due to their ages, are not able to readily access programs conducted on a multi-county basis. Occasionally, agent or specialist faculty may cover an even larger geographic area that may span two or more planning districts. These faculty remain housed in county or city Extension offices, although their territory spans several jurisdictions. In Virginia, agents continue to be county or city agents who have multi-county responsibilities in their areas of specialization.

By utilizing multi-county area programming, effective local work continues while, at the same time, a high degree of specialization facilitates the delivery of in-depth programs. Area programming provides for 1) a strong local educational program; 2) increased specialization and training of staff; and 3) a balanced approach to regional programming.

Agent specializations are based on local needs and are subject to change. Current specializations for multi-county programming include:

ANR: Animal Science, Commercial Horticulture, Crop & Soil Sciences, Dairy Science, Environmental Horticulture, Environmental Sciences, Farm Business Management, Integrated Pest Management, Tobacco

4H: Youth Development

Family & Consumer Sciences: Nutrition & Wellness, Family & Human Development, and Management, Housing and Consumer Education

Virginia Cooperative Extension works closely with local governments to reach consensus on specializations, positions, funding arrangements, and other support services which each partner is expected to provide.

Local governments in Virginia provide one-third the salaries and benefits of extension agents. Through multi-county cooperation, these local governments have agreed to allow ANR and FCS agents to work across county or city lines in order to increase efficiencies and better utilize scarce resources. Counties and cities within the planning district negotiate and mutually agree on the percentage of the required one-third salary and benefits each locality will contribute on each agent position. These percentages vary widely given the fact that specialties may be in greater demand in one county than in a neighboring county.

Stakeholder Input

For many years, VCE had a network of county/city advisory committees which were expected to give input on programs and assist in issues identification. Inadequate attention was paid to the development of these committees, and their effectiveness began to erode. In 1994, VCE restructured its umbrella Virginia Cooperative Extension Leadership Council (VCELC) and developed a new system of local Extension Leadership Councils (ELC's) designed to be in place in every county and city cooperating on extension programs. Very specific guidelines and indicators of quality were developed for these councils to ensure that the citizens led the councils and provided the appropriate input on issues, program needs, evaluation, and funding of research and extension programs. At present, ninety percent of all counties and cities with extension programs have fully functioning local ELC's, and the remaining ten percent are in the process of revitalizing and forming improved councils. These councils, under the umbrella of the VCELC, are critical to the ability of extension and research to design and direct their efforts to meet public needs. In addition to the state ELC and the local ELC's, program leadership councils for all three major program areas involve citizens and staff in more in-depth analyses of needs and program design.

The following listing gives information on the many groups which ensure that extension and research receive adequate stakeholder input on issues, programs, and the use of federal formula and other funds:

Extension Leadership Councils

Virginia Cooperative Extension has a state leadership council (VCELC), ninety-five local leadership councils (ELC's), and program leadership councils for 4-H, family and consumer science, and agriculture and natural resources. Over 1,200 citizens are members of the ELC's. A mechanism has been established that facilitates the VCELC's connections with local ELC's and other appropriate stakeholders. VCE requires that all extension leadership councils represent the diversity of the population served. In this way, widespread stakeholder input can be received in an open and fair manner.

The local ELC's function as a partner with the local Extension unit to assist in:

1) planning, developing, implementing, evaluating, and reporting on Extension programs that meet local needs; and 2) designing, implementing, and evaluating a marketing and development strategy for the local Extension unit and its programs. The ELC's set program priorities based on identified community needs.

VCELC membership now consists of representation from all 22 Virginia planning districts, at-large members appointed by the director and administrator, all VCE District Directors, all chairpersons (or designees) of the VCE program leadership councils, (FCS, 4-H, ANR), the VCE Director (Virginia Tech), the VCE Administrator (Virginia State University), the designated VCE staff from both Virginia Tech and Virginia State University, the 1862 director of the agricultural experiment station, the 1890 director of research, the deans of the related colleges, and the director of governmental relations at Virginia Tech.

VCELC members receive the minutes of the meetings of the local ELC's in their planning districts. Likewise, VCELC members communicate with the chairpersons of the local ELC's on a regular basis to discuss mutual extension concerns. The VCELC is currently developing a checklist which will be used by its members on an annual basis to document the work of the local ELC's. Included will be items which will check local ELC effectiveness in obtaining open input from all potential clientele groups; diversity of membership; issues identification; outcome and impact assessment; and resources to support programs. Local ELC's will normally be expected to conduct local issues forums every two years. Other items will be added as the document is developed. This annual review process will be in place by January 1, 2000.

Virginia State University Extension Leadership Council

Virginia State University is presently forming an 1890 Extension Leadership Council. The Council membership will consist of statewide representation of clientele, faculty and other

professionals in a format composed of three sub-councils. The purpose of the council is to establish open and regular communications between the VSU Division of Agriculture and the Council. The Council will assist the division, extension and research, in program determination, implementation and evaluation. There will be a continuing dialogue between the council and the 1890 Programs. There will be representation on the VCELC from the 1890 ELC.

Agriculture and Natural Resources Leadership Council

The Virginia Tech College of Agriculture and Life Sciences Leadership Council formed an ANR Council in July, 1999. The ANR council functions as a sub-group of the College of Agriculture and Life Sciences Leadership Council. The Council will assist in the identification and description of critical short-term, intermediate, and long-term agricultural issues facing Virginians. The Council will consider current and planned ANR extension and research programs, funding, and structures and make recommendations on the needs of industry, producer and consumer clientele.

Family and Consumer Sciences Leadership Council

The Family and Consumer Sciences Leadership Council provides vision for the Virginia Cooperative Extension Family and Consumer Sciences (FCS) program and develops strategies which lead to the fulfillment of that vision. The FCS Leadership Council identifies statewide problems, issues, and concerns; assesses current programs and decides on the prioritization of program resources including funding; creates and monitors a strategic plan; explores opportunities for cooperation and collaboration; and monitors and reports program outcomes to appropriate public and private partners.

4-H Leadership Council

The 32 member 4-H Leadership Council was formed in 1994. It represents the diversity of the 4-H program and includes all major stakeholders. The Council identifies statewide problems, issues, and concerns; assesses current programs and decide the future status of programs; identifies other potential statewide partners for collaboration and possible funding sources; and monitors program outcomes and recommends adjustments as needed. The expected end product of the Council's activities is an educational program that meets the needs of the youth of Virginia.

Local Issues Forums

The 106 extension unit offices conduct local issues forums on a periodic basis. These forums are open to the general public, the local ELC's, local and state governmental officials, and staff of cooperating agencies. These forums provide an opportunity for anyone present to learn about program successes and to express opinions about community educational needs. ELC operating guidelines recommend conducting the forums at least every two years.

Local Government Reports

County and city governments differ as to how they prefer to receive reports on extension programming efforts in the localities. Some local governments prefer written reports which are reviewed by the elected governing board members. Others prefer that the agents attend board meetings on some periodic basis. When this occurs, the reports are presented in the public board meeting where the public is invited to attend and comment.

Annual Public Hearings

The Virginia General Assembly conducts annual public hearings on the proposed state budget on a regional basis. Members of the public are invited to comment on any aspect of the budget, including extension and research budgets. VCE distributes information about the hearings and, along with the local ELC's, encourages attendance and helps arrange carpooling for attendees. All clientele, including 4-H youth and under-served and under-represented audiences, are encouraged to attend.

College of Human Resources and Education

The College of Human Resources and Education (CHRE) continues to strengthen outreach and networking with external stakeholders through Advisory Boards. In 1999, nineteen advisory boards were active. The total number of citizen members and representatives of agencies and industry involved in advisory boards for CHRE exceeds 300.

College of Natural Resources

The College of Natural Resources (formerly Forestry and Wildlife Resources) maintains an active, external Advisory Council consisting of representatives of a wide variety of companies, state and federal agencies, non-governmental organizations, citizens and others central to the mission of the College. Currently the Council has 60 members, and meets formally on campus once each year. Other committee meetings, both formal and informal, occur throughout the year. The college provides an annual report to the Council each March. The Advisory Council provides valuable input to the college on all aspects of its teaching, research, and outreach programs.

College of Agriculture and Life Sciences Leadership Council

The college council membership is composed of over eighty individuals, external to the University, invited by the Dean. The purpose of the council is to establish open and regular communications between the college and the council and mutually understand the programs and activities of the college and the needs and aspirations of the professions and citizens it serves.

A Plan to Serve Virginia Agriculture, Human, and Natural Resources

Virginia Tech completed a major effort in 1996 to devise a comprehensive strategic plan for the University. The College of Agriculture and Life Sciences and the VCE/VAES Division at Virginia Tech form an integral part of that planning process and engaged a public process to develop The Plan to Serve Virginia Agriculture, Human, and Natural Resources. This involved meeting with 20 academic departments in four colleges, 12 off-campus research centers,

extension leadership councils which represented 106 city and county extension offices, and dialogue with nearly 90 agricultural and natural resource organizations around the state. Through this planning process, priorities were set for the teaching, research, and extension programs. The Plan was also posted on the college's homepage for review and input.

The strategic planning process that led to the development of The Plan identified critical short-term, intermediate, and long-term agricultural and economic issues which need to be addressed. Among these were several broad categories that depend upon the expertise available through the extension and research division. From these categories, two main objectives for the VCE/VAES Division were formed:

- To develop and disseminate to the citizens up-to-date, research based knowledge in food, nutrition, health, and biotechnology
- To develop and disseminate to the citizens up-to-date research based knowledge in agriculture, forestry, and natural resources.

Agriculture Industry Boards

Various commodity boards and other groups fund research projects annually on a competitive basis. This process provides valuable input to researchers about the focus of research efforts via the producer (stakeholder) input. The boards are “self-help” groups created by state law within the Virginia Department of Agriculture and Consumer Services for the purpose of promoting research, education and marketing efforts. The boards use funds generated through assessments that growers and producers of these commodities have agreed by referendum to pay for programs and projects that would benefit their commodities. Two board programs are funded either by licensing fees or a portion of revenue collected in taxes. Members of most of the boards are appointed by the Governor from recommendations made by the various industry groups.

The groups are as follows:

Virginia State Apple Board
Virginia Cattle Industry Board
Virginia Corn Board
Virginia Cotton Board
Virginia Small Grains Board
Virginia Horse Industry Board
Virginia Peanut Board
Virginia Pork Industry Board

Virginia Irish Potato Board
Virginia Sheep Industry Board
Virginia Soybean Board
Virginia Sweet Potato Board
Virginia Bright Flue-Cured Tobacco Board
Virginia Dark-Fired Tobacco Board
Virginia Winegrowers Advisory Board

Additionally, the Virginia Agricultural Council was established by the General Assembly to provide a mechanism for financing agricultural research, education and services. Funding comes from assessment levied on certain agricultural supplies used by farmers. The Governor appoints

18 members of the Council who represent a wide range of farm commodities. Research and extension personnel applying for these funds, likewise, are provided valuable stakeholder input during the competitive awards process.

Peer Review Process for Proposed New Research Projects

Division of Agriculture, Virginia State University

The Division of Agriculture in the School of Agriculture, Science and Technology consists of the Agricultural Research Station (ARS), Cooperative Extension Service (CES), Department of Agriculture (DOA), and International Agricultural Programs (IAP) hereafter referred to as units. The review process governs all proposals developed under the umbrella of the Division.

Purpose: To institutionalize the proposal development and review process for the Division of Agriculture and thus provide a mechanism to strengthen and enhance the University land grant mission.

Submission of Request for Approval to Submit Proposals Form - Any applicant within the Division of Agriculture who desires to submit a proposal for consideration must first complete and submit a Request for Approval to Submit Proposals Form to the appropriate Unit Head for review and approval. The Unit Head relays approved form to the Associate Dean for Agriculture for further review and approval after which it is returned to the applicant via the Unit Head for full proposal development.

Development of Proposal - All appropriate University and funding agencies' policies, procedures and guidelines should be adhered to when developing a proposal. Proposal development and submission deadlines should be governed by the following: (1) Review and approval of Request for Approval to Submit Proposal Form will take one working day; (2) Division of Agriculture Proposal Peer Review Committee (described below) will take up to five working days; and (3) University review and approval will take up to five working days.

Review of Full Proposals- A full proposal will be submitted by applicant(s) to the Unit Head who in turn transmits it to the Dean for Agriculture for review by the Proposal Peer Review Committee. Upon completion of review and necessary revisions, the proposal will be sent through the normal University approval process. The Associate Dean's Office will facilitate this process.

Submission of Proposal to Funding Source - Upon University approval, the proposal will be collected and submitted by the applicant to the appropriate funding source.

Peer Proposal Review Committee -This committee will be responsible for reviewing grants and proposals taking into account a broad area of consideration including the needs of the state and people of Virginia and the United States, the degree of relevance of the proposal research to the land-grant mission and priorities of the University, the need for initiation of research in new areas, and other matters related to grantsmanship. The committee will pay particular attention to scientific and technical merit, opportunities for cooperation in the proposed research with other individuals and units within the University and the Virginia clientele. A Chair who is appointed by the Associate Dean for Agriculture in consultation with the Dean, School of Agriculture, Science and Technology will facilitate the work of the committee. Committee members will be made up of appropriate faculty members from each unit of the Division and others as necessary. Care is taken in selection of committee members to ensure that they will not review proposals in which they will be the principle or co-investigator or collaborator. The Chair will be responsible for coordinating and reporting the review of each application to the Associate Dean for Agriculture.

Functions of the review committee are (1) to review all proposals for scientific and technical merits; (2) to ensure that all proposals fulfill the land-grant mission and priorities of the University; (3) to ascertain that what is being proposed lies within the full range of expertise and capability of the investigators and the University, notwithstanding their official duties, responsibilities, and assignments; (4) to assist applicants with acceptable proposals in locating outside peer reviewers to further review the proposals, if necessary for substance and overall quality.

The proposal process is as follows:

1. Each proposal will be submitted by applicant through the appropriate unit head to the Associate Dean for Agriculture.
2. The Associate Dean for Agriculture will relay the proposal to the Chair for distribution to the Committee members.
3. Each Committee reviewer will prepare a detailed written critique of the proposal and return it to the Chair in advance of the meeting of the Committee.
4. The Associate Dean for Agriculture and unit heads will be the intermediaries between the applicant and the reviewers, and if additional information or explanations are needed, the request is made through the Associate Dean in consultation with the appropriate unit head. If the applicant wishes to provide any additional material or communicate any Information to the Committee, that also must go through the Associate Dean for Agriculture.
5. At the formal Committee meeting, which is convened by the Chair, each proposal will be reported on by the reviewers who prepared the detailed critique, after which other members may make comments or ask questions. The Chair then will notify the Associate Dean for Agriculture immediately of the final decision of the Committee through a written appraisal including verbatim comments of the reviewers on the proposal.

6. The Associate Dean for Agriculture, upon review of the Committee's recommendations and consultation with the Dean, School of Agriculture, Science and Technology and appropriate unit head, will notify, through unit head, the applicant of the final decision on the proposal.
7. All questions concerning the application from then on will be directed to the Associate Dean for Agriculture, including requests for information regarding the Committee's decision.
8. A full proposal will be returned for final revision and further peer review if necessary prior to submission through the normal University system for internal processing. The project PI may recommend non-committee peer reviewers to the Associate Dean for Agriculture; however, the Associate Dean, in consultation with the Committee, the appropriate unit head and the Dean, will make the final decision.
9. Implementation of suggestions made by reviewers will be the primary responsibility of the applicant.

Virginia Agricultural Experiment Station, Virginia Tech

Research under the Hatch, McIntire-Stennis, and Animal Health and Disease Acts is conducted in four Colleges that constitutes the Virginia Agricultural Experiment Station (VAES): (1) College of Agriculture and Life Sciences, (2) College of Forestry and Wildlife Resources, (3) College of Human Resources and Education, and (4) Virginia-Maryland Regional College of Veterinary Medicine.

One of six VAES Project Review Committees will review each new VAES project proposal: (1) Agriculture and Forestry Competitiveness - Animals, (2) Agriculture and Forestry Competitiveness - Plants, (3) Human Nutrition, Food, and Health, (4) Environment and Natural Resources, (5) Economic, Social, and Community Resources, and (6) Processes and Products.

These Committees are based upon the USDA Current Research Information System (CRIS) classification system, the Strategic Research Plan of the Experiment Station Committee on Organization and Policy (ESCOP), and the Agricultural Research Extension and Education Reform Act of 1998 (AREERA). This arrangement encompasses the interdisciplinary research of the four Colleges.

The Assistant or Associate VAES Director within each College recommends senior faculty members with competence in the subject area to serve on the Project Review Committees that are relevant to the College's research programs. The Director appoints three core Committee members, and they serve three-year terms. For each VAES project proposal submitted, the Assistant or Associate VAES Director in the project leader's home College will chair the review. The Chair is responsible for selecting 1) the appropriate Project Review Committee

(which includes the three core members), and 2) two or more ad hoc members who are proficient in the subject covered by the proposed project. These may be chosen from outside the University if recommended by the Department Head.

The Project Leader will request a review by the Virginia Agricultural Experiment Station statistician who will certify that the proposed experimental design and statistical analyses are adequate, using the appropriate VAES form. The Project Leader then submits the proposal and the statistician's certification to his/her Department Head for review in accordance with departmental procedures. The Department Head will transmit the departmentally approved project proposal to the Chair of the Project Review Committee for that College.

The Chair distributes copies of the proposal to the appropriate Project Review Committee. If the proposed research involves animals, human subjects, or recombinant DNA, a copy of the proposal and a protocol form will be sent to the appropriate University committee. After the prescribed review period, the Chair will convene the Committee, the Project Leader, and the Department Head to review the proposal. The Chair requests reviewers' comments and forwards these to the Project Leader and Department Head prior to the oral review. The oral review may be omitted, at the discretion of the Chair, if a majority of the review forms are checked by the reviewers as "approved with no changes" or "approved with minor changes." If an oral review is not conducted, the Chair will provide a written summary of the Review Committee comments to the Project Leader.

Each proposal will be evaluated according to the following criteria:

1. Is the proposed research relevant to the goals of the Department and College, the needs of the people the research would serve, and the priorities established by Task Forces, Work Groups, or Commodity Research Committees?
2. Are the objectives and procedures clearly stated?
3. Is the proposed duration realistic for the research that is proposed?
4. Are the appropriate or desirable individuals cooperating on this project?
5. Does the project list impacts to Virginia (and elsewhere) or anticipated economic importance?
6. Does the Project Leader's vita indicate the level of competence required for doing the proposed research?

The Committee recommends that the proposal be either approved with no changes, approved with minor changes, revised and resubmitted, or rejected.

The Project Leader will comply with the recommendations of the Project Review Committee and submit the revised proposal to the Department Head, accompanied by a letter delineating the changes that were made in response to the recommendations of the reviewers and/or a

rebuttal for any recommendations which the Project Leader does not accept. The Department Head will transmit to the Chair.

The Chair will sign Form AD-416 and transmit the above items to the VAES Associate Director accompanied by a letter listing names of the reviewers and date of the oral review. The letter should also state that all recommendations of the Committee have been incorporated into the final proposal. In the event that all recommendations have been incorporated, the Chair should indicate concurrence. For McIntire-Stennis proposals, the Administrative-Technical Representative (A-TR) must sign Form AD-416, certifying that the proposal complies with the purposes of the McIntire-Stennis Act.

The VAES Director will meet with the Chair, the Department Head, and the Project Leader if there are any questions or concerns. When the Project Leader, the Department Head, the Chair of the Project Review Committee, and the Director agree that the proposed project should be accepted, the Director will approve it, assign a project number, and transmit it to CRIS/CSREES/USDA. Forms AD-416, AD-417, and CSREES-662 will be transmitted electronically.

After approval by CSREES, the Director will send copies of the AD-416 and AD-417 and any written comments from CSREES to the Chair of the Project Review Committee, the Department Head, and the Project Leader. Copies of these documents, the proposal, the statistician's certification, and all pertinent correspondence will be retained in the official project file in the VAES Directors office.

Manuscript Peer Review – Virginia State University:

Manuscripts once submitted to the Research Director will be forwarded for external review. Abstracts will be distributed to Virginia State University/Agricultural Research Station community (for information only) with listing of authors as it appears on the manuscripts. If someone feels that his or her name needs to be included in the manuscript, the matter will be brought to the attention of the author(s) of the manuscript and the Research Director.

The time frame for external review of manuscripts is set at eight weeks. This time frame starts on the day the manuscript is submitted to the VSU Research Director. This implies that the external reviewer will have to return the edited manuscript within the above specified time frame. In the absence of a response from the selected external reviewer within the set time frame, the author(s) will have the option to send the unedited version of the manuscript to the journal of their choice.

Peer Review Process for Virginia Agricultural Experiment Station Publications - Virginia Tech

Manuscripts for publication in the Bulletin Series or the Information Series of the Virginia Agricultural Experiment Station will receive a peer review administered by the VAES Associate Director. Two peer reviewers, anonymous to the author(s), will be selected from Virginia Tech or from outside the University if special expertise is not available locally. The Unit Leader will be consulted when outside reviewers are deemed necessary. The VAES Manuscript Review Form will be completed by the reviewer and returned to the author by the VAES Associate Director. Acceptance or rejection of the manuscript will be decided after due consideration of the reviewers' comments. In the event that all recommendations are not included, then sufficient written rebuttals must be supplied by the author.

At the request of Virginia State and to promote coordination, Virginia Tech reviews manuscripts from Virginia State that eventually will be submitted for publication in refereed journals. Two anonymous reviewers at Virginia Tech are selected to review each manuscript.

Tentative Guidelines for Review of Multistate Research Projects

Final guidelines will be developed as experience is gained by the partner institutions in working with Multistate Projects under AREERA. Basically, project PIs will submit a written project proposal conforming to an outline format typical for the institutions involved. At the very least, the proposal will contain a title, justification, review of key literature, objectives, procedures, duration, personnel (with time commitments, and funding arrangements (at least for the first year). The institution with the highest resource commitment to the project will take the lead in coordinating the peer review. In short, the process will be an amalgamation of local peer review procedures. Upon mutual agreement, the administrators of the project PIs will decide on the number of peer reviewers and the home institution of these reviewers. If a Multistate Project includes an extension component, then appropriate extension peer reviewers will be included in the review panel. Multistate Projects may run for up to five years and must include an annual review of progress towards achieving objectives.

Merit Review Process for Extension

The merit review process for extension programs covers all programs conducted by Virginia Cooperative Extension, a joint program of Virginia Tech and Virginia State University. VCE Program leadership teams develop extension programs and review programs on an annual basis and make decision to maintain, modify, or create new programs to meet the needs identified through external and internal stakeholder input.

VCE addresses a broad range of problems and issues facing citizens of the Commonwealth through focused educational programming. This is accomplished and reported through VCE's web-based Planning and Reporting system, which includes long range goals operationalized by annual program plans and reports. The foundation upon which program plans are built is the identification of strategic issues. This is achieved through strategic issues analysis, which is a

process of collaboratively determining what problems exist at local, regional, and state levels, and then deciding which ones have become issues of major public concern. This becomes the background and rationale for deciding which problems and issues can be addressed with VCE time, energy, and human and fiscal resources.

Problems and issues identified through strategic issues analysis are communicated through the system and educational program proposals are developed by interdisciplinary Program Leadership Teams (PLTs) composed of specialists and agents. In 1998, there were 33 PLTs. These teams are organized around and reflect the breadth and scope of priority problems and issues facing the citizens of the Commonwealth. Program proposals identify programming ideas and support that will be provided to local units by the PLTs. The program proposals developed by PLTs are reviewed by VCE programming leadership. Program proposals that most appropriately reflect and address local problems and issues are selected for implementation.

Once approved, program proposals are distributed to all agent and specialist faculty. Faculty select the appropriate proposals for their situation by providing specific information, including the amount of time they plan to devote to the program. At this point, the program proposals become program plans for VCE. At the end of the year, each local unit and campus faculty member completes an annual accomplishment report documenting program activities, results, and impacts for each program plan to which they have allocated time. A state report is then prepared by each PLT, which summarizes the accomplishments and impacts for each program plan they manage.

VCE programming focuses on how VCE addresses problems and issues. Program Leadership Teams provide program ideas and support (e.g., guidance on program development, provision of publications and other resource materials, agent training, presentations, etc.) through the program plans; local units customize these plans and conduct programs with clientele. Some specialists and Program Leadership Teams also work directly with clientele (e.g., poultry and seafood).

Program Outcomes and Impacts

Extension programs focus on guiding targeted audiences confronted with a problem or issue from awareness, to increased knowledge and skill, to adoption of desired behavior that will improve a problematic situation over a period of time. They involve working with the target audience through an educational program that is systematic and sequential. Specific program outcomes, or impacts, are identified through program objectives stated in the plans. These objectives occur at four levels, and include changes in: 1) peoples' awareness of problems, 2) peoples' knowledge and skills relating to problems, 3) peoples' behaviors to address problems, and 4) the broader consequences that accrue to individuals, organizations, and communities.

Indicators are specified for each objective, and an evaluation plan is developed to measure the indicators. Indicators are measurable events accepted as evidence that the objective has been achieved. Indicators of increased farm profitability might be a decrease in production costs, or an increase in production output. An indicator of improved family nutritional status might be an increase in consumption of fruits and vegetables. Evaluation plans specify how the indicator data will be collected. Examples of evaluation plans include before and after program questionnaires, telephone surveys, personal interviews, and structured observation. Objectives, indicators, and evaluation plans are unique to each program and are based upon specific outcome or impact information needs at the state and federal level.

In addition to the evaluations which occur as part of the on-going planning and reporting process, evaluation specialists conducted in-depth impact studies of the following seven selected extension programs during 1998-99:

- Strong Families-Competent Kids
- Lawn Knowers
- 4-H Camping Program
- Integrated Pest Management Multi-State Evaluation
- Livestock and Grain Pricing Update
- EFNEP Cost Benefit Analysis
- Nationwide Adult and Youth EFNEP State Implementation Characteristics Survey

During each fiscal year of this plan of work, certain programs will be selected to undergo an intensive, in-depth evaluation similar to those seven referenced above.

Merit reviews of extension programs are accomplished by the Program Leadership Teams which do the following :

- Lead the work of the program leadership team to which they are assigned, using sound group dynamics practices, and principles of adult and youth education.
- Consult with Administrative Advisor regarding progress, problems, concerns, and questions.
- Obtain Planning and Reporting System assistance from Program Development staff via Administrative Advisor.
- Guide the team to the on-line submission of proposal(s) that meet the criteria for acceptance (merit).

- Following salaried staff response, finalize the program proposal and submit on time.
- Lead the team in implementing and evaluating the program proposal.
- Coordinate the preparation and submission of the state annual report for program proposals the team manages.
- Coordinate the preparation of new proposals in the next planning phase.
- Prepare a personal and team action plan that reflects the team leadership position as well as other work, and a staff development plan and submit these to the supervisor with a copy to Administrative Advisor.

Multi-State Research and Extension Activities

This section of the plan includes preliminary information on multi-state activities to demonstrate Virginia's on-going integrated research and extension work across disciplines, with other institutions, and with other states. Since specific guidelines on Sections 105 and 204 have not yet been distributed by CSREES, a full response to these items cannot be included. Virginia will amend its plan as instructed by CSREES, when the guidelines are finalized

Multi-State Research Projects

Virginia State University

Virginia State University's Agricultural Research Station (VSU-ARS) will maintain a diverse and appropriate portfolio of regional projects involving multiple institutions, disciplines, states and regions. Shown below is the current portfolio of regional research projects where VSU-ARS is an active partner.

Project ID, Project Title and Participating States/Institutions:

Uniques for Pesticides in Water Samples.....	AK, FL, GA, MS, NC, Puerto Rico, SC, TN, TX, VA, USDA-ARS
Management of Soybean Root Rot (RR-7).....	AL, GA, MD, MS, TN, VA
Is; blood metabolism research on nematode.....	parasite research, histological processing/analysis, artificial insemination technology, forage sample analysis; germplasm preservation technology; and grazing systems).

NC, LA, VA, FL, USDA/ARS (Beltsville, Beckley)

and Expression VAW-521203alamensis.....
VA, USDA/ARS

Content and Pathways to Resistance.....
SD, VA, USD/AIARS

Grant No
Risk Management Education Grant.
DE, NC, MD, VA, USDA/NCIS.

Virginia Tech

The VAES likewise maintains a diverse and appropriate portfolio of regional projects involving multiple institutions, disciplines, states and regions. At present there are 35 projects listed in the Current Research Information System (CRIS). These include 6 Northcentral Region projects, 7 Northeast Region projects, 6 Western Region projects, and 16 Southern Region projects. Additionally, VAES participates in three National Research Support Projects.

A representative sampling of Multistate Projects includes:

Project ID	Project Title and Participating States/Institutions
NRSP-3	National Atmospheric Deposition Program USDA (ARS, CSREES, USFS), DOC, NOAA, DOE, ANL, LANL, ORNL, DOI (BLM, NPS, FWS, USGS), EPA, TVA, NASA, NSF, CO, NY, KY, UT, IO, KS, LA, FL, MI, MO, NC, OH, OR, PA, IN, TX, SD, AK, AR, FA, IL, MA, ME, MD, MN, NE, PR, VA, VT, WA, WS, UT, 15 State & Local Agencies, 2 Native American Tribes, 11 industries, and 7 other research groups.
NC-119	Management Systems for Improved Decision Making and Profitability of Dairy Herds. AL, AZ, CA, FL, GA, IL, IN, IA, KS, MI, MN, MO, NE, NH, NM, NYC, OH, PA, SD, TN, TX, VA, WA, WI
NC-140	Rootstock and Interstem Effects on Pome

and Stone Fruit Trees. AR, CA, CO, GA, IL, IN, IA, KS, KY, MA, MD, ME, MI, MN, MO, NC, NJ, NYG, OH, OR, PA, SC, SD, TN, UT, VA, VT, WA, WI, WV

- NC-168 Advanced Technologies for the Genetic Improvement of Poultry. AL, AR, CA, CANADA, DE, IL, IA, MD, MA, MI, MN, NC, OH, IN, VA, WI, USDA/ARS
- NC-208 Impact Analysis and Decision Strategies for Agricultural Research. AL, CA, FL, -ATHENS, ID, IA, LA, MI, MN, MO, MT, NE, NJ, NYC, TX, VA, WI, ERS/USDA
- NC-209 Genetic Improvement of Cattle Using Molecular Genetic Information. AZ, CA, IL, IA, MA, MI, MN, OH, SD, USDA/ARS, VA, WI
- NC-220 Integration of Quantitative and Molecular Technologies for Genetic Improvement of Pigs. AL, GA, IN, IA, MI, NE, NC, NC, OH, OK, VA, USDA/ARS
- NE-162 Rural Economic Development: Alternatives in the New Competitive Environment. AZ, CA, DE, GA, IN, KY, MI, MN, MO, NV, NYC, NH, NC, OH, OR, PA, RI, SC, UT, TX, VA, WA, WI, USDA/ERS/ED
- NE-165 Private Strategies, Public Policies, and Food System Performance. AR, CA, CTS, FL, GA, IL, IN, IA, KS, LA, MD, MA, MI, MN, MT, NE, NH, NJ, NYC, NC, OH, RI, TX, VA, WI, USDA/ERS, USDA/RBS, USDA/AMS, USDA/PSA, CDCP, FDA, GAO
- NE-183 Multidisciplinary Evaluation of New Apple Cultivars. AR, CTH, GA, MA, ME, MI, MO, NC, NH, NJ, NYC, NYG, OH, OR, PA, VA, VT, WA, WI, WV, PA/RODALE, WV (USDA), CANADA

- S-009 Plant Genetic Resources Conservation and Utilization. AL, AR, FL, GA, HI, KY, LA, MS, NC, OK, PR, SC, TN, TX, VA
- S-145 Nutritional Systems for Swine to Increase Reproductive Efficiency. AL, AR, FL, GA, KY, LA, MS, NC, OK, SC, TN, TX, VA
- S-263 Enhancing Food Safety Through Control of Foodborne Disease Agents. AL, AR, GA, IA, KY, LA, MI, MN, MS, NE, NC, SC, TX, VA
- S-273 Development and Application of Comprehensive Agricultural Ecosystems Models. AL, FL, GA, IL, IA, KY, LA, MD, MN, NCSU, OH, OK, TN, TX, VA, NC, USDA-ARS
- S-275 Animal Manure and Waste Utilization, Treatment, and Nuisance Avoidance for a Sustainable Agriculture AL, CA, FL, GA, HI, IL, IN, IA, KY, LA, MN, MI, NC, OR, SC, TN, TX, VA, WI, USDA-ARS
- S-278 Food Demand, Nutrition and Consumer Behavior CA (Davis), CA (Berkeley), FL, GA, IL, IN, IO, KS, LA, ME, MN, NJ, NY, NC (Raleigh), NC (Chapel Hill), OH, OR, SC, TN, TX, VA, WA, WV, WS, USDA (ARS, CNPP, ERS, FCS), USBLs
- S-280 Mineralogical Controls on Colloid Dispersion and Solid-Phase Speciation of Soil Contaminants. AL, FL, GA, KY, LA, MS, NC, OK, PR, SC, TN, TX, VA, USDA/NSSL, DOE
- S-285 Reproductive Performance of Turkeys. AR, CA, MN, NC, OH, OR, SC, VA, WI, USDA/ARS
- W-102 Integrated Methods of Parasite Control for Improved Livestock Production. ARS, AZ, CA, FL, IA, KS, LA, MN, MO, MT, UT, VA, WA

W-128 Microirrigation: Management Practices to
Sustain Water Quality and Agricultural
Productivity. ARS, AZ, CA, CO, GA, HI, IA,
KS, MI, NM, OR, TX, VA, WA, WY

W-181 Modifying Milk Fat Composition for
Improved Manufacturing Qualities and
Consumer Acceptability. CA, ID, IL, MN,
NYC, OH, SC, SD, UT, VA, WA, WI

It should be noted that VAES and VCE likewise participate in numerous Southern Research and Extension Activities (SERAs) not listed herein. Further the above regional research projects and SERAs will be continued into the foreseeable future. New Multistate Projects will be implemented as time, resources, opportunities, and need dictate within AREERA mandates.

New Multistate Projects being formed under AREERA by Virginia Tech and partner institutions include:

Molecular Endocrine Mechanisms Controlling Gonadal Function in Turkeys.
VA, MN

Chemical, Hydrolytic and Sensory Comparisons of Wines Produced from Ten
Genetically Characterized Strains of Brettanomyces intermedius.
VA, CA (CSU-Fresno)

Biocomplexity in Aquatic Ecosystems.
VA, NC (UNC-Chapel Hill), CA (Davis)

One long-standing program (begun in 1968) being converted to an AREERA Multistate Project is the Peanut Variety Quality Evaluation Program (PVQE) conducted jointly with North Carolina State University.

This joint research project has as its main objective to evaluate advanced peanut breeding lines from the breeding programs of both states for acceptability by the total peanut industry. Only those advanced breeding lines proven acceptable by all segments of the industry (grower, seller, manufacturer, and consumer) are released as new varieties. Since the state line divides the production area of these two states almost in half with Virginia's production in nine southeastern counties and most of North Carolina's production in 14 northeastern counties, sharing equally in the operation costs of this program was a natural. Private breeding lines may be entered on a fee basis if supporting data merit their testing.

The personnel and facilities are located at Virginia Tech's Tidewater Agricultural Research and Extension Center (TAREC) in Suffolk, Virginia which is situated in the center of the Virginia-North Carolina (V-C) peanut production area. Although both universities equally share funding, administrative matters and personnel are assigned to Virginia Tech. Research plots are located on four privately owned farms throughout the V-C area in addition to the TAREC in Suffolk, Virginia which is the home base for this project.

An advisory committee composed of a grower, seller, manufacturer, researcher and extension specialist from each of the two states acts in an advisory capacity. The committee is co-chaired by experiment station associate directors from each state. This committee reviews data collected from each segment of the peanut industry and makes recommendations to either the Virginia Tech or North Carolina State University plant germplasm release committees concerning acceptability for release of advanced breeding lines as new peanut varieties. This procedure assures the entire peanut industry a voice in deciding the acceptability of any new peanut variety release before it becomes available for mass production. They also review all data submitted by private breeders and vote on the merits of testing these privately developed lines in the PVQE program.

A total of 403 advanced breeding lines have been evaluated for acceptability by the entire peanut industry through this program, with 27 released as new peanut varieties. Of the 27 new variety releases, 21 have been from public universities and six new varieties have come from the private sector. All of the large-seeded, Virginia-type peanut varieties grown today have been evaluated by the PVQE program and subjected to review and recommendation of the advisory committee representing the total peanut industry.

The peanut industry has come to rely on data collected through this program to show prospective buyers (foreign and domestic) the desirability of specific varieties for specific needs. Examples of this are varieties with improved shelf-life, brighter pod color for in-shell processing, and higher extra large kernel content for certain foreign buyers.

The two partners will continue supporting this worthwhile program as a Multistate Project. Two universities, with mutual interest in a crop grown in the same production area, joining together to support one research program has proven to be a cost-effective and productive partnership.

Multi-State, Multi-Institutional, Multi-Disciplinary Extension Work

Virginia Cooperative Extension (VCE) conducts educational programs, exchanges information, and shares training of faculty in specific subject matters with neighboring states. In addition, VCE interacts in a cooperative and mutually beneficial arrangement with many other related institutions and agencies in Virginia. Extension agents and specialists in Virginia have built

excellent working relationships and extended their reach by working in a multidisciplinary manner within Virginia Tech (1862) and Virginia State University (1890).

The following examples provide selected highlights of Virginia's multi-state, multi-institution, and multi-disciplinary extension work.

Multi-State:

- An on-going relationship with North Carolina Extension Service (NCES) agents and specialists in Christmas Tree production programming including jointly held meetings, field days and research trials; project planning with NCES for New River-National Heritage River programs; joint training with NCES for the Community Voices Leadership Program (Kellogg Foundation); beef and dairy production and marketing meetings involving farmers from Virginia and North Carolina.
- Specialists and agents from Virginia, North Carolina, and West Virginia are developing a new multidisciplinary 4-H curriculum dealing with resources of the New River Watershed.
- Joint program delivery with Tennessee Cooperative Extension Service (TCES) on 4H environmental education; tobacco production; the development of the Agriculture Show in Kingsport, Tennessee, which includes educational programs, displays, and trade shows; and a conference on Home-Based Businesses, Bed and Breakfast Inns in the Cumberland Gap area.
- Joint educational programs in beef and forages with Kentucky agents and specialists.
- Agricultural tours of Virginia farms for agents from neighboring states.
- Strawberry, blueberry and asparagus production and marketing educational programs conducted jointly with Maryland and West Virginia.
- Joint teaching of educational programs on Urban Nutrient Management with Maryland, North Carolina and Washington, DC.
- Virginia and Maryland are merging current programs in family finance education to increase volunteer involvement in program delivery and support.
- Joint effort with Maryland, Pennsylvania and Washington, DC to implement integrated pest management on 75% of agricultural land in the Chesapeake Bay basin.
- Program to train food bank personnel in Washington, DC; Virginia includes limited income children from Washington in the 4-H "Kids' Café" camp.
- Child-care programs conducted jointly by Virginia and West Virginia resulted in 79% of the participants reporting adoption of improved health and safety procedures. The Virginia/West Virginia Advisory Council (VAWVAC) won three team awards including the National Extension Association of Family and Consumer Sciences Florence Hall Award.
- Virginia and North Carolina work together on the Southeast Beef Veterinary Consortium.
- Conducted an orientation for agents and specialists in Virginia, Pennsylvania, Kentucky and Iowa on Virginia's newly developed draft system to establish price and purchase/grow silage on contract.

- Conducted a multi-state beef cattle marketing seminar with participants from West Virginia, Virginia, Maryland and Pennsylvania.
- Conducted a bull test and feeding trial with owners from both Virginia and West Virginia.
- Virginia is assisting Maryland by temporarily covering Maryland's beef and dairy veterinary work until a vacancy at Maryland can be filled.
- Virginia participated in a multi-state regional Food Safety project to study emerging pathogens and their relationship to food processing practices.

Multi-Institutional:

Virginia Cooperative Extension's agents and specialists collaborate with numerous state and federal agencies, all county governments and many city governments, colleagues in other colleges and universities, and commodity groups and associations. Examples of multi-institutional extension collaboration include the following:

- Clinch Valley College, Emory and Henry College, Virginia community colleges
- Gallaudet University
- Virginia Horticulture Society
- Virginia Department of Agriculture and Consumer Services
- Homeowners' Associations
- Fine Arts Associations
- Farmers' Markets
- Hospitals and Nursing Homes
- Departments of Social Services
- Health Departments
- Local school systems
- Department of Education, Department of Forestry
- Shelter homes and housing developments
- Child and dependent care centers
- Local Parks and Recreation Departments
- YMCA/YWCA
- Mental Health/Mental Retardation Services
- Agriculture commodity groups
- Virginia Farm Bureau Federation
- Virginia Agri-business Council
- Environmental Protection Agency
- Native American Tribal Association
- Food banks
- American Association for Retired Persons
- Department of Conservation and Recreation, Farm Service Agency, Natural Resources Conservation Service, Division of Soil and Water Conservation
- USDA, CSREES

Multi-Disciplinary:

Agents and specialists continue to work together on local problems of mutual concern. There is greater evidence that agents in agriculture, family and consumer sciences and 4-H are combining their expertise to provide an interdisciplinary approach to issues of concern. Likewise, specialists on and off campus are working more closely with colleagues in different but related disciplines to combine research efforts to explore matters of local and state concern. Some examples of recent interdisciplinary efforts include the following:

- Specialists from the College of Agriculture and Life Sciences and the College of Human Resources and Education are working together on food science and food safety issues. This is being done in collaboration with partners at USDA and other states.
- Agents in all program areas are working on problems identified by the Children, Youth and Families at Risk (CYFAR) program.
- Family and Consumer Sciences agents have worked with the 4-H program on topics such as LifeSmarts, nutrition education, consumer education, family economics, small business management, super-sitters education, and others.
- Agriculture and Natural Resources agents work with 4-H youth in programs related to livestock, crops, gardening, and water quality.
- ANR and FCS agents have worked jointly on programs in family economics, financial management, Home*A*Syst, and nutrition.
- Master Gardeners have provided programs for 4-H youth on topics such as home gardening, water quality, and nutrient management.
- Agriculture agents have provided education on pest control as part of the FCS Food Sanitation training programs.
- Specialists in environmental sciences have collaborated with faculty in biology, forestry and other disciplines.
- Specialists in agricultural and applied economics have partnered with faculty in crop science to assist producers facing financial problems.

Goal 1: To achieve an agricultural production system that is highly competitive in the global economy.

Statement of issue(s)

Today in Virginia, agriculture is an industry that employs one-sixth of the work force and generates one-sixth of the state's economic activity. Agriculture is a \$35 billion industry. Forestry related activities add another \$11.5 billion to Virginia's economy, and employ an additional 225,000 people. Although agriculture's past accomplishments are enviable, breakthroughs in biotechnology and information technology will combine to produce even greater agricultural productivity with reduced resource inputs. Advances in information technology will increase educational efficiency, the potential for global marketing of value-added agricultural products, and the ability to recruit and educate future scientists, professionals and leaders.

Over 70% of the farmers in Virginia have annual gross farm sales of less than \$20,000. A typical Virginia farmer works 40 hours a week at an off-farm job. Small and part-time farmers need enterprises that generate high income from small acreage and/or small herds or flocks. Traditional crop and livestock enterprises generally require large volume production to earn profits. Specific efforts must continue to be made to provide education to hard-to-reach audiences. These audiences may not have a formal education, reliable transportation, or be able to afford high initial investment costs. They may need a focused individual attention to succeed at a new farm enterprise.

Aquaculture is another rapidly expanding form of Agriculture in the nation, and is projected to be a major global market-driven growth industry in the future. The Virginia Aquaculture Industry has grown from less than \$1 million in revenues in 1980 to more than \$20 million in sales of cultured marine and freshwater aquatic species in 1995, and production is increasing. Aquaculture has been identified as a state initiative by the Virginia General Assembly and the Governor, and it is a program area continuing to receive new funding. The success of the Virginia aquaculture industry is the result of increasing consumer demand for a healthy, affordable, and contaminant-free food fish product.

Meat goat production is a new and attractive livestock enterprise for Virginia producers. The number of meat-type goats in Virginia has increased 450% over the last 14 years with more than 9,000 head. The number of Virginia farms with goats has risen from 297 in 1978 to 1,096 in 1992; a 270% increase. According to the state statistician, meat goat numbers have increased dramatically since 1992 as will be validated by the goat census to be conducted at the end of 1997. This shows Virginia farmers' increasing interest in goat production.

To achieve agriculture and forestry production systems that are highly competitive nationally and internationally, Virginia must produce commodities and specialty products that: (1) have

high level of demand on global markets, (2) are safe to humans and the environment, (3) are produced with minimum impact on the environment, and (4) are well promoted and attractively priced. The two institutions achieve these goals through programs of research, extension, and teaching.

Overall, the main program thrusts in agricultural production systems programs at Virginia Tech and Virginia State are (1) production, processing, and marketing efficiency, (2) quality and uniqueness of Virginia products, (3) profitability and competitiveness for Virginia agriculture and forestry enterprises, (4) protecting soil and water, both their abundance and quality, and (5) social and structural well-being of families and communities.

Performance goal(s); output/outcome indicators; evaluation framework

OBJECTIVE 1: To produce new and value-added agricultural products and commodities.

Performance goal 1: To annually increase the research and knowledge-base available from CSREES partners and cooperators on new and value-added commodities and products in U.S. agriculture.

Indicators: Number and type of significant research projects on new and value-added commodities and products in U.S. agriculture.

Evaluation framework: CRIS reports will be examined to document significant research projects on new and value-added commodities and products in U.S. agriculture.

Performance goal 2: To annually increase agricultural producer awareness, understanding, and information regarding the production of new and value-added commodities and products in U.S. agriculture in which CSREES partners and cooperators play an active research, education, or extension role.

Indicators: The total number of persons completing non-formal education programs on production of new and value-added commodities and products.

Evaluation framework: Data to document achievement of this performance goal will come from the VCE Planning and Reporting System.

OBJECTIVE 2: To increase the global competitiveness of the U.S. agricultural production system.

Performance goal 1: To annually increase the research and knowledge base available from CSREES partners and cooperators on improving the productivity and global competitiveness of the U.S. agricultural production system.

Indicators: Number and type of significant research underway or proposed that will result in improvements in the productivity and global competitiveness of the U.S. agricultural production system.

Evaluation framework: CRIS reports will be examined to document significant research underway or proposed that will result in improvements in the productivity and global competitiveness of the U.S. agricultural production system.

Performance goal 2: To increase agricultural producer awareness, understanding, and information on improving the productivity and global competitiveness of the U.S. agricultural production system in which CSREES partners and cooperators play active research and extension roles.

Indicators: The total number of persons completing non-formal education programs to improve the productivity and global competitiveness of the U.S. agricultural production system.

Evaluation framework: Data to document achievement of this performance goal will come from the VCE Planning and Reporting System.

OBJECTIVE 3: To improve decision-making on public policies related to the productivity and global competitiveness of the U.S. agricultural production system.

Performance goal 1: To annually increase the research and knowledge-base available from CSREES partners and cooperators on public policy issues affecting the productivity and global competitiveness of the U.S. agricultural production system.

Indicators: Number and type of significant research underway or proposed on public policy issues affecting the productivity and global competitiveness of the U.S. agricultural production system.

Evaluation framework: CRIS reports will be examined to document significant research underway or proposed on public policy issues affecting the productivity and global competitiveness of the U.S. agricultural production system.

Performance goal 2: To annually increase the effectiveness of constituent and citizen participation on public policy issues affecting the productivity and global competitiveness of the U.S. agricultural production system.

Indicators: The total number of persons annually completing non-formal education programs on topics related to public policy issues affecting the productivity and global competitiveness of the U.S. agricultural production system.

Evaluation framework: Data to document achievement of this performance goal will come from the VCE Planning and Reporting System.

Key program component(s)

Research

Numerous strategies will be employed by Virginia Tech and Virginia State to maintain diverse research programs addressing competitiveness in agricultural and forestry systems. Some of these strategies are:

- Conduct market research to determine domestic and global demand for agriculture and forest-based commodities.
- Design and implement research on market-based solutions for achieving sustainable environmental and natural resource systems that are compatible with economic growth.
- Develop processes and design production systems to ensure safety and quality, production efficiency, and waste reduction in food and non-food processing.
- Develop efficient systems for small ruminant meat production to decrease the dependency upon imports of these products, while emphasizing sustainable systems, suitable for small-scale production.
- Using waste products such as poultry litter, apple pomace, seafood waste, and stockpiled fescue to reduce livestock production costs. Develop liquid fuels and polymers from wood and agricultural waste to replace some materials presently produced from non-renewable resources.
- Establish "precision farming" methods that select specific cultivars and control the application rate of fertilizers and chemicals based on the need and production potential of specific soils and ecosystems.
- Refining computer-aided grading and defect-recognition systems for secondary manufacturing of wood products.
- Use rapid, biotechnology-based methods to detect plant pathogens in seeds, planting materials, and ecosystems in order to reduce pathogen transmission and infection of crops.
- Develop transgenic plants and animals as bioreactors for creating the human therapeutic products that are now rare and expensive.
- Identify alternative uses for agriculture commodities and low-value timber resources and develop processes for developing new products. Evaluate the production of alternative and non-traditional crops.
- Enhance the multiple benefits of agriculture and forest management through the application of remote sensing and geographic information technology.
- Establish small ruminant meat production systems to impact small and part time farmers, looking to diversify their operations or seeking to explore alternative use of resources.
- Study new and traditional crops including agronomic and breeding research, nutritional quality research, alternative means of insect-pest management, reduction of inorganic fertilizer uses, utilization of agricultural waste, on farm animal manures, and other aspects related to domestic and international agriculture.
- Develop sustainable technology for producing food and industrial use crops that also have export potential, and for export, into areas that exploit the desire of consumers for "health" foods and vegetables produced with reduced pesticide input. These include new oil seed crops with oils that have unique properties for industrial use, the development of vegetable soybeans for direct human use, sustainable greenhouse vegetable production using biological insect control, and new legumes for food and nitrogen fixation.
- Use molecular cell biology and biotechnology to improve the performance and efficiency of food and fiber production.

- Develop technologies for recycling wood- and agriculture-based materials, including farm waste, solid wood, and paper products.
- Develop management systems for transgenic crops that will reduce pesticide use and control pests.
- Develop World Wide Web and computer-assisted decision aids that will enhance all areas of agriculture and forestry.
- Create and refine diagnostic, therapeutic, and preventive technologies, including biotechnological techniques that will improve farm animal health, well-being, and disease prevention.
- Identify through biotechnology and traditional plant breeding methods disease resistant varieties of economically-important agronomic crops.
- Generate technology and expertise to ensure production of economical and wholesome food and efficient use of natural resources, and to improve the knowledge base making it available at the local, state, national, and international levels.
- Integrate plant breeding with evaluation of biochemical components, pest resistance, and agronomic characteristic; advanced biochemical techniques will be developed and used for modification of components important in nutrition or for industry. Greenhouse pesticide reduction will require the integration of existing technology and biological materials with new strategies.

Extension

Numerous strategies will be employed by Virginia Tech and Virginia State to maintain extension education programs addressing competitiveness in agricultural and forestry systems. Some of these strategies are:

- Develop and provide educational programs to assist farm family members working together both from a family and farm management perspective.
- Provide educational programs that will enhance Virginians' understanding of and appreciation for the issues related to agricultural and forestry production and that encourage a high level of sophistication in the consumption of agricultural and forestry products.
- Generate and disseminate knowledge in production economics, farm and agribusiness management, financial management, marketing and price processes, and policy analyses that will improve agricultural and forestry competitiveness.
- Provide educational programs that assist farm families in financial risk management.
- Provide educational programs on consumer economics, specifically as it applies to business and farm management and the families that own the business or farm.
- Provide educational programs that assist individuals and families in making the transition from welfare to work.
- Develop natural resource conservation plans that can be integrated with sustainable development principles, thereby protecting the natural resources that Virginians value so highly.

- Work with landowners to select management practices that allow economic development while simultaneously conserving wildlife and other natural resources.
- Provide students and agricultural entrepreneurs with an economic framework and the research-based information that allows them to successfully respond to economic and technical changes affecting the competitiveness of Virginia's agricultural and forest industries.
- Provide educational and technical assistance to Virginia Producers. Specific efforts will be made to reach small, limited resource and socially disadvantage clientele.
- Educational strategies will include field days, conferences, on-farm demonstrations, producer meetings, one-on-one visitations, and distribution of publications and fact sheets.
- Materials and technologies to be used will include personal computers, Internet, Electronic mail, satellite uplinks and downlinks, and two-way video conferencing; publications, fact sheets, slide programs, videotapes, etc.
- Deliver educational programs using the most up-to-date information technologies.
- Develop specific web sites for specific agricultural and forestry audiences for continuous and instantaneous informational transfer.
- Develop new techniques and strategies for investigating and reporting problems with animal and human public health and food safety.
- Provide cutting-edge educational programming to the farm, forest, turf, and landscape industries on the subjects of best management practices, potential non-point source nutrient effects on water quality, and variety evaluation and recommendations for Virginia's soils and climate.
- Continue to provide soil survey characterization data to enhance decision-making capabilities with regard to potentials and limitations of particular soils for agriculture, forest, and urban development.
- Develop and utilize geographic information systems for natural resource management in the state.
- Develop the research-based information needed by private and public leaders when developing governmental policies, programs, and regulations to assure that policy goals and objectives are realized.
- Develop and deliver research based educational programs on Alternative and Sustainable Agriculture.

Internal and external linkages

Research projects planned to achieve the objectives will be interdisciplinary including departments at Virginia Tech and Virginia State University, including the off-campus Agricultural Research and Extension Centers. External cooperation will be based on the nearly 80 agencies and commodity organizations that endorsed the Virginia Tech strategic plan, the "Plan to Serve Virginia Agriculture, Human, and Natural Resources and the Virginia State University Division of Agriculture Strategic Plan." Participation and cooperation by state and federal agencies and other universities will be important in achieving the research and extension

objectives in Goal I. Further, activities require multi-disciplinary teams of experts in plant breeding, agronomy, biochemistry, and entomology, along with a link to producers through extension personnel. The USDA germplasm collections and ARS facilities provide materials and human support. Private industry participation is encouraged. Collaborations are material, informational, and, in some cases, financial.

All segments of society are impacted to some degree by the issues of declining rural populations/prosperity, and increasing concern over pesticide use. Limited resource farmers in the small to mid-sized range will benefit from new opportunities to meet consumer demands. Tobacco farmers with limited acreage of a high value crop require special consideration in adjustment to new economic realities if they are to survive. The results of our research will be published in scientific journals and made available to our clientele through demonstrations and Extension programs that are focused on the needs of small and limited resources producers, and the traditionally under served.

In conducting their research and extension programs, Virginia Tech and Virginia State rely on mutually beneficial collaborations and linkages with other appropriate land grant institutions, the Virginia Department of Agriculture and Consumer Service (VDACS), the Virginia Department of Environmental Quality (DEQ), and other state and local agencies and groups. They rely heavily on the land-grant federal/state partnership with the United States Department of Agriculture (USDA) administered through its Cooperative State Research Education and Extension Service (CSREES). Additionally the two institutions cooperate and collaborate with other USDA agencies such as the Agriculture Research Service (ARS), the Natural Resources Conservation Service (NRCS), and Economic Research Service (ERS), and others.

Target audiences

Virginia Tech and Virginia State serve four primary sectors of agriculture and forestry of the Commonwealth: (1) students, (2) private entrepreneurs and leaders, including limited resource farmers, (3) public officials, and (4) professionals. More specifically, these sectors include: undergraduate and graduate students, entrepreneurs, researchers, other universities, leaders, professionals, commercial, and small and limited resource farmers/producers. Entrepreneurs; state, national, and international public officials; the agribusiness and finance communities; producers; consumers; the general public; and all Virginia landowners involved in agriculture and forestry with continuing emphasis on small and limited resource farmers.

Program duration

Long term program (2000-2004).

Allocated resources

Extension Funding

Year	Federal	State	Local	Other
2000	3,139,906	8,773,279	1,575,233	1,332,276
2001	3,234,103	9,036,477	1,622,490	1,372,244
2002	3,331,126	9,307,571	1,671,165	1,413,411
2003	3,431,060	9,586,798	1,721,300	1,455,813
2004	3,533,992	9,874,402	1,772,939	1,499,487

Research Funding

Year	Federal	State	Local	Other
2000	11,554,000	18,662,000	0.0	6,784,000
2001	11,856,000	19,214,000	0.0	6,988,000
2002	12,167,000	19,783,000	0.0	7,198,000
2003	12,488,000	20,368,000	0.0	7,413,000
2004	12,819,000	20,970,000	0.0	7,635,000

Extension FTE's

Year	Professional			Paraprofessional		
	1862	1890	Other	1862	1890	Other
2000	125.9	6.8	0.0	0.4	16.0	0.0
2001	125.9	6.8	0.0	0.4	16.0	0.0
2002	125.9	6.8	0.0	0.4	16.0	0.0
2003	125.9	6.8	0.0	0.4	16.0	0.0
2004	125.9	6.8	0.0	0.4	16.0	0.0

Research SY's Only

Year	1862	1890	Other
2000	98.6	7.43	0.0
2001	99.6	7.43	0.0
2002	100.6	7.43	0.0
2003	101.6	7.43	0.0
2004	102.6	7.43	0.0

Goal 2: To provide a safe and secure food and fiber system.

Statement of issue(s)

While the American food supply is among the safest in the world, there are still millions (estimated twelve to twenty-one million) of Americans stricken by foodborne illness every year, and some 9,000 people a year die as a result (mostly the very young and elderly). The threats are many, ranging from *Escherichia coli* (E. coli) O157:H7 in meat and apple juice, to *Salmonella* in eggs, on chicken, in dairy products, and on produce, to *Cyclospora* and *Cryptosporidium* on fruit and in fruit juices, to hepatitis A virus in frozen strawberries. According to the Centers for Disease Control (CDC) Five Year Summary of Foodborne Disease Outbreaks 1988-1992, the foodservice industry is the largest single source of reported foodborne illness outbreaks with 44%, followed by a distant second of food prepared at home (23%). The leading cause of foodborne illness is the mishandling of foods, allowing bacterial growth.

The area of food safety is so important that the Clinton administration has proposed an ambitious, \$43-million Food Safety Initiative designed to strengthen and improve food safety practices and policies. The initiative includes expanded education efforts aimed at consumers, food service workers, and various other segments of the food community; enhanced food safety inspection and monitoring efforts; and an increase in research to develop new and more rapid detection methods and preventive techniques to increase food safety. The Department of Health and Human Services (FDA), the U.S. Department of Agriculture, and the Environmental Protection Agency prepared the report, "Food Safety From Farm To Table," which outlines recommendations on improving U.S. food safety. The centerpiece of the inspections segment of the initiative revolves around the HACCP (Hazard Analysis Critical Control Point) concept, a science-based preventive approach to safe food production. To improve food safety, issues must be addressed from "farm to table."

Performance goal(s); output/outcome indicators; evaluation framework

OBJECTIVE 1: To improve access to an affordable, healthful, and culturally relevant food supply.

Performance goal 1: To annually increase the research and knowledge-base available from CSREES partners and cooperators on food accessibility and affordability.

Indicators: Number and type of significant research underway or proposed on food accessibility and affordability.

Evaluation framework: CRIS reports will be examined to document significant research underway or proposed on food accessibility and affordability.

Performance goal 2: To annually increase consumer awareness, understanding,

and information on food accessibility and affordability in which CSREES partners and cooperators plan an active research, education, or extension role.

Indicators: The total number of persons participating in non-formal consumer education programs on food access and food affordability.

Evaluation framework: Data to document achievement of this performance goal will come from the VCE Planning and Reporting System.

Performance goal 3: To increase the effectiveness of constituent and citizen participation on public policy issues affecting food security (i.e., food access, affordability, and recovery).

Indicators: The total number of persons participating in non-formal education programs on public policy issues affecting food security (i.e., food access, affordability, and recovery).

Evaluation framework: Data to document achievement of this performance goal will come from the VCE Planning and Reporting System.

OBJECTIVE 2: To improve food safety by controlling or eliminating food-borne risks.

Performance goal 1: To annually increase the research and knowledge-base available from CSREES partners and cooperators on food safety and food borne risks and illnesses.

Indicators: Number and type of significant research underway or proposed on food safety and food borne risks and illnesses.

Evaluation framework: CRIS reports will be examined to document significant research underway or proposed on food safety and food borne risks and illnesses.

Performance goal 2: To annually increase consumer awareness, understanding, and information regarding food safety and food borne risks and illnesses in which CSREES partners and cooperators play an active research, education, or extension role.

Indicators: The total number of persons participating in non-formal, consumer education programs on food safety and/or food borne risks and illnesses. The total number of individuals completing food handler certification programs conducted by CSREES partners and cooperators on an annual basis.

Evaluation framework: Data to document achievement of this performance goal will come from the VCE Planning and Reporting System.

Key program component(s)

Universities in general and Virginia Tech specifically have major roles in ensuring food safety through the research, teaching and extension programs. The prevention of foodborne illness is a major responsibility of food producers, processors, distributors, retailers and regulatory agencies. To meet the goal of producing safe food products for Virginia, national and international markets, Virginia Tech faculty have played a major role in developing

internationally adopted principles and conducting training programs for producing safe food products. These principles which are called the Hazard Analysis Critical Control Points system (HACCP) serve as a basis for processors and regulatory agencies to identify hazards in producing foods, establishing critical control points in processing for hazard control and monitoring for assuring product safety. Research programs have addressed and will continue to address rapid detection methods, predictive modeling systems for food safety, processing techniques to eliminate or reduce pathogens, development of procedures to prevent pathogen contamination, management practices, etc.

Food safety is addressed by extension through workshops with producers, processors, distributors, retailers and consumers. In addition, extension personnel work directly with each clientele group on food safety issues. Our undergraduate and graduate students are taught the principles of food safety in most classes including, food microbiology, food processing, advances in food microbiology, dairy processing, quality assurance, poultry processing, veterinary toxicology, (nearly all food animal veterinary courses have a food safety component) and many others. The Virginia-Maryland College of Veterinary Medicine has research, teaching and extension programs that ensure that animals entering the food supply are free of disease. The animals may still harbor organisms that are pathogenic to humans including *Salmonellae*, *Cryptosporidium*, *E. coli* 0157:H7 and others. Programs are on-going to develop better detection systems and ways to treat animals harboring pathogens. Food Science and Technology examines food safety issues during processing and develops intervention systems. This department has an active extension program to train processors, distributors, federal, state and local government inspectors, and others. The Department of Human Nutrition, Foods and Exercise Science works with consumers to promote food safety. The Department of Hospitality and Tourism works with all aspects of the food service industry to enhance food safety.

Internal and external linkages

Internal linkages in the area of food safety span the colleges of Agriculture and Life Sciences, Human Resources, Veterinary Medicine, Forestry and Wildlife, and Engineering. Joint projects among Departments within these colleges show internal linkages.

External linkages include the U.S. Meat and Poultry HACCP Alliance. Drs. Susan Sumner, Cameron Hackney, and Norman Marriott are certified instructors for meat and poultry HACCP. Merle Pierson, is Chair of the Institute of Food Technologists Committee on Codex Alimentarius. Codex Alimentarius with a membership representing 165 countries is responsible for developing international standards and principles for food quality and safety. Dr. Pierson serves as IFT's delegate to the Codex Committee on Food Hygiene. Dr. Michael Jahanke is also a CODEX representative. In addition, Dr. Pierson serves as Chair of the HACCP subcommittee of the National Advisory Committee on Microbiological Criteria for Foods (NACMCF). NACMCF members are appointed by the Secretary of Agriculture and

the Secretary of Health and Human Services. This panel advises its sponsoring agencies (USDA, FDA, DoD, and DoC) on microbiological food safety issues. Drs. George Flick, Cameron Hackney and Merle Pierson are certified seafood HACCP instructors and Dr. Flick is a member of the Seafood HACCP Alliance, which in partnership with FDA trains all seafood processors and federal and state inspectors on seafood safety. Cameron Hackney and Susan Sumner are approved instructors for the U.S. Poultry and Egg HACCP courses. Other external linkages include working with Debra Jones of Virginia State University on food safety issues. She is a member of Cooperative Extension's food safety committee. The faculty of Virginia Tech work extensively with the Virginia Department of Agriculture and Consumer Services and the Department of Public Health. State inspectors are trained in the latest food safety areas and they work with us on food safety laws and regulations. Finally, work will continue with national associations such as International Dairy Foods, National Food Processors, U.S. Fruit and many others. For example, the National Food Processors Association recently contributed over \$200,000 of equipment to Food Science and Technology to enhance food processing/safety research. Virginia Tech is working with their scientists on several food safety projects and have numerous joint publications and grants. Scientists from the associations often serve as committee members for graduate student research programs.

Target audiences

Food safety is an issue that affects everyone and must address issues from farm to table. Target audiences include students (undergraduate and graduate) producers, processors, distributors, extension agents, retailers, consumers and federal food inspectors. In addition, extension personnel work directly with each clientele group on food safety issues. University students are taught the principles of food safety in various classes. One of the primary classes (food microbiology) is being modified as a distance learning class. The lecture will be broadcast along with modular labs. Extension personnel will continue to develop workshops to train the target audiences. Successful state programs will be expanded to national audiences. We will work with national organizations to insure consistency of delivery materials.

Program duration

Long term program (2000-2004).

Allocated resources

Extension Funding

Year	Federal	State	Local	Other
2000	236,863	661,824	118,830	100,502
2001	243,969	681,679	122,395	103,517

2002	251,288	702,129	126,067	106,623
2003	258,827	723,193	129,849	109,822
2004	266,592	744,889	133,744	113,117

Research Funding

Year	Federal	State	Local	Other
2000	513,000	937,000	0.0	346,000
2001	529,000	965,000	0.0	356,000
2002	545,000	994,000	0.0	367,000
2003	561,000	1,024,000	0.0	378,000
2004	578,000	1,055,000	0.0	389,000

Extension FTE's

Year	Professional			Paraprofessional		
	1862	1890	Other	1862	1890	Other
2000	11.4	0.0	0.0	0.0	0.0	0.0
2001	11.4	0.0	0.0	0.0	0.0	0.0
2002	11.4	0.0	0.0	0.0	0.0	0.0
2003	11.4	0.0	0.0	0.0	0.0	0.0
2004	11.4	0.0	0.0	0.0	0.0	0.0

Research SY's Only

Year	1862	1890	Other
2000	4.9	0.0	0.0
2001	4.9	0.0	0.0
2002	4.9	0.0	0.0
2003	4.9	0.0	0.0
2004	4.9	0.0	0.0

Goal 3: To achieve a healthier, more well-nourished population.

Statement of issue(s)

The growing cost of health care and the loss in human potential that results from unhealthy lifestyle practices and inadequate preventive health behaviors is receiving increased attention from both government planners and health professionals. Desired lifestyle practices including a prudent diet providing optimum amounts of wholesome and nutritious food, regular physical activity, avoidance of smoking and other addictive substances, and responsible use of alcohol significantly reduce the risk of chronic disease and premature death. In children lifestyle patterns that promote health support optimum growth and attainment of individual learning potential. The Virginia Department of Health (Comprehensive Prevention Plan) estimated if only 10% of Virginians changed their health behaviors in the areas of body weight, exercise, high blood pressure, smoking, or alcohol abuse, approximately 1400 fewer people would die each year, productivity would increase by \$40 million and tax revenue by \$1.7 million. On a national basis more than 13% of the Gross National Product or \$2864 per person is spent on health care and these numbers are increasing. The projected increase in the elderly population provides further impetus for health education addressing positive health practices and accessibility to preventive health care that can delay the onset and progression of degenerative diseases.

Although most Virginians have more than adequate amounts of food available to them, there is need to address the issue of improper diets. Current nutritional challenges include the prevalence of obesity, dietary excesses of fat, saturated fat, cholesterol, and sodium, and inadequate intakes of fiber and particular vitamins and minerals. Such dietary imbalances contribute to the development of heart disease, cancer, and stroke, responsible for more than 32,000 deaths in 1994 (the most recent year for which statistics are available) or 62% of all Virginia deaths. It is estimated that treatment for heart disease and cancer averages \$27,000 per person or over \$880 million per year statewide.

The risk of chronic diseases such as heart disease, cancer, and osteoporosis, which lead to disability and a degraded quality of life, can be reduced or ameliorated through appropriate diet and exercise patterns that should be initiated in childhood. In 1994, 56% of Virginians did not exercise, 24% were overweight, 22% had high blood cholesterol, 22% had high blood pressure, 23% smoked, and 15% abused alcohol. The major priority for Virginia Extension educators over the next five years will be to deliver educational programs that can lead to the reduction of chronic disease risk among all age groups. The building of collaborative relationships and linkages with Virginia community agencies and with nutrition experts and researchers in Virginia institutions of higher learning will facilitate both the development of appropriate subject matter curriculum and its delivery to targeted audiences.

Performance goal(s); output/outcome indicators; evaluation framework

OBJECTIVE 1: To optimize the health of consumers by improving the quality of diets, the quality of food, the number of food choices, and providing health educational programs.

Performance goal 1: To annually increase the research and knowledge base available from CSREES partners and cooperators on human nutrition, and family and consumer sciences.

Indicators: Number and type of significant research underway or proposed on human nutrition, and family and consumer sciences.

Evaluation framework: CRIS reports will be examined to document significant research underway or proposed on human nutrition and family and consumer sciences

Performance goal 2: To annually reduce the health risk factors through non-formal educational programs to improve dietary habits and physical exercise practices in which CSREES partners and cooperators play an active research, education, or extension role.

Indicators: The total number of persons completing non-formal nutrition education programs on better management of health risk factors (e.g., obesity, hypertension, etc

Evaluation framework: Data to document achievement of this performance goal will come from the VCE Planning and Reporting System.

Performance goal 3: To annually increase consumer awareness, understanding, and information on dietary guidance and appropriate nutrition practices in which CSREES partners and cooperators play an active research, education, or extension role.

Indicators: The total number of persons completing non-formal nutrition education programs that provide dietary guidance to consumers.

Evaluation framework: Data to document achievement of this performance goal will come from the VCE Planning and Reporting System.

Key program component(s)

Extension and research faculty at Virginia Tech and Virginia State represent expertise in nutrition, exercise science, and health education. A recently developed strategic plan is focused on nutrition and health education to promote the development of positive lifestyle behaviors among youth and to encourage appropriate behavior change in adults. The Dietary Goals for Americans that define a healthy and varied diet with generous intakes of complex carbohydrates and fiber and limited intakes of fat, saturated fat, sodium, and sugar provide the foundation for programs directed to all age groups. An active lifestyle that includes regular walking or other physical activity prevents the development of obesity and assists in weight loss or weight management if inappropriate weight gain has already occurred. Regular physical activity coupled with recommended intakes of calcium supports the normal development of

bones in childhood and adolescence and reduced loss of bone mass and risk of osteoporosis and bone fracture in later life. Smoking increases one's risk of all major chronic diseases including osteoporosis and avoidance of smoking or smoking cessation will lower the incidence of health problems and consequent health care costs. Despite the strong public interest in health and fitness, many individuals are misinformed about recommended dietary changes or appropriate levels of physical activity, and are not convinced that such changes carry benefit for them.

People of all ages and income and educational levels need guidance on what dietary changes to make and how to incorporate these changes into a normal eating pattern using accessible foods. Enjoyment of food is a basic consideration for most people and, to be successful, nutrition education programs must teach participants how to choose and prepare tasty, appealing food that is consistent with their cultural or ethnic background and available resources. When working with low-income audiences with limited literacy skills, a sense of hopelessness, and multiple problems that interfere with the procurement and preparation of adequate amounts of wholesome food, empowerment and motivation become particular challenges for the nutrition educator. The adoption of a more active lifestyle by all population groups requires the health educator to provide both motivation and a sound knowledge base, particularly for those individuals who may have been leading a sedentary lifestyle and must gradually change their activity pattern.

Program Implementation and Community Collaborations

Nutrition education and health promotion activities will address the needs of Virginians of all ages. Appropriate patterns of food choices, as well as food safety, are emphasized in programs for daycare providers. These workshops also address nutrition issues such as menu planning and snack selection that mirror the Dietary Goals and promote fruits and vegetables and high calcium foods.

Several collaborative programs now in place involve the pooling of resources to provide nutrition and health education to children of school age. Virginia Cooperative Extension has a strong working relationship with the Virginia Department of Education School Nutrition Program, including the USDA supported Team Nutrition. In-school programs related to nutrition are being coordinated with 4-H activities in each locality. A new curriculum is being developed for delivery at the six 4-H educational centers to teach healthy food and exercise patterns. Hands-on workshops for school food service personnel are being implemented through joint efforts of the Virginia Department of Education, Virginia Tech, and the National School Food Service Institute.

Extension faculty members are active participants in the Virginia Osteoporosis Coalition that represents a joint effort of the Virginia Department of Health, Medical College of Virginia, and local community agencies. Planned programs include work with school children, adult education, and workshops for health professionals. Virginia Extension educators will be

involved at all levels. In many of these examples distance education technologies are being used to facilitate.

Internal and external linkages

Adults will be reached through a variety of activities coordinated with local businesses and voluntary agencies. Lunch time classes in the workplace that address healthy eating or weight loss have been successful in reaching workers who because of time commitments or transportation problems do not attend evening programs. Active participation of county extension faculty in the state's Transition from Welfare to Work program has included classes addressing personal health issues and the need for appropriate diet and lifestyle choices. The Welfare to Work program is reaching many ethnic and cultural groups that are traditionally under-served with health care and information. Enabling a high level of self-care can both enhance quality of life and reduce future health care costs. Needs of senior citizens for diet- and health-related information will be met through programs held at congregate meal sites and senior centers in cooperation with Virginia Area Agencies on Aging. Lessons stressing good calcium sources and walking for maintaining bone health may be especially important with older audiences. Workshops that provide guidance in meal planning and healthy choices will address the needs of dietary managers at community care homes and residential homes for developmentally impaired young adults and physically impaired older adults. Collaborative activities with local hospitals and local affiliates of voluntary health associations such as the Virginia Heart Association or Virginia Cancer Society will be aggressively initiated. Such activities may include sponsoring health fairs, classes, public access television programs, or other events. Virginia Extension educators will continue to develop and acquire materials such as mailed lessons to reach people who may not choose to participate in face-to face programs. The recently piloted Change of Heart lesson series was found to result in behavior change in the targeted homemakers who chose fewer high fat food items and more fruits and vegetables. On-going collaborative education activities with the Virginia Small Grains Board has resulted in workshops for Virginia Extension educators focusing on lowfat grain foods and a series of newsletters for consumers.

Research Mission

Chronic diseases such as coronary heart disease, hypertension, diabetes, osteoporosis, and cancer take a heavy toll on individuals, families, and communities in terms of quality of life, sickness and disability, and health care expenditures. Despite considerable effort over many years, we still do not totally understand the interrelationships of food, nutrients, physical exercise, and heredity in determining risk of disease and disability. At this time we do have some knowledge of the influence of dietary fats on blood lipoprotein patterns and coronary risk, but the effects of micronutrients or particular vegetable proteins or fiber are areas of current inquiry. On-going research at Virginia Tech in the Department of Human Nutrition, Foods, and Exercise (HNFE) is directed toward dietary and activity behaviors that influence chronic

disease risk, particularly, cardiovascular disease. A current project is exploring the relationship between dietary fat, fiber derived from a wood product, exercise patterns, and serum lipid profiles using an animal model.

Another aspect of this work is the mechanism by which soy protein exerts a favorable effect on serum lipid profiles, and recipes for baked products incorporating soy protein, suitable for household use, are being developed and tested by consumer panels. Collaborative work with the Virginia Tech Department of Crop and Soil Environmental Sciences has resulted in the development of consumer-acceptable fat-substituted products made with soft red wheat that are low in fat and support the current dietary guidelines that encourage increased use of grain products. This work is being extended to focus on batter characteristics such as "stickiness" that influence the application of these product formulations to commercial baking using large scale mixers. Techniques developed by the Virginia Tech Center for Sealant and Adhesive Science have been adapted for use in evaluating the physical characteristics of batters and doughs.

Increased attention is being directed toward the role of micronutrients such as folate in the development of atherosclerosis. HNFE researchers are investigating the effect of folate intake and genetic influence on homocysteine metabolism in older humans. Molecular biology methods now provide an opportunity to examine the effect of gene expression on nutrient requirements and metabolism in human subjects. Molecular biology is also being used to determine the influence of vitamin B-6 status on immune function using an animal model. The effect of marginal vitamin B-6 status on immune function is particularly relevant at this time as recent work suggests that vitamin B-6 requirements may increase in older age and inadequate intakes could be related to the compromised immune function observed in some elderly people.

Two current national public health initiatives are emphasizing increased consumption of fruits and vegetables and calcium-rich foods. One HNFE researcher is collaborating with a researcher in the Virginia Tech Department of Horticulture to develop edible coatings for fresh fruits and vegetables that would increase their shelf life, making them more attractive to consumers and maximizing the profitability for Virginia fruit and vegetable growers. A cooperative project of HNFE and the Virginia Tech Department of Food Science and Technology involves the development of reduced lactose dairy foods suitable for lactose intolerant populations that include African Americans, many Hispanics, and older people. A second component of the dairy project involves the use of focus groups as a data-gathering tool with women of all ages to determine factors that influence their use of dairy foods, important sources of biologically available calcium. Results from these focus groups will support the development of education programs and materials that will motivate increased use of dairy foods.

Other faculty are exploring the effectiveness of different methods of delivery of nutrition and health information in bringing about behavior change in various population groups. Both mailed

lessons and video lessons appear to have promise as change agents with individuals who because of work schedules or geographic isolation are not able to attend other classes or meetings. Further refinement of these methods with particular age, sex, income, and cultural and ethnic groups is continuing.

Regular physical activity combined with a healthy and adequate food intake promotes physical well-being at all ages, and slows the loss of muscle leading to weakness and disability at older ages. Exercise science researchers are evaluating the effect of consistent exercise and nutritional supplements on muscle metabolism and muscle strength in young subjects. Muscle fiber studies using animal tissues are concentrating on those changes in muscle contractile proteins that result in cardiac failure or physical disability.

Target audiences

A variety of audiences are targeted to receive education through this goal. They include youth of all ages; senior adults; limited resource families; childcare providers; public school personnel; and the general public.

Program duration

Long term program (1999-2003).

Allocated resources

Extension Funding

Year	Federal	State	Local	Other
2000	1,654,126	4,621,834	829,845	701,854
2001	1,703,750	4,760,489	854,740	722,910
2002	1,754,863	4,903,304	880,382	744,597
2003	1,807,509	5,050,403	906,793	766,935
2004	1,861,734	5,201,915	933,997	789,943

Research Funding

Year	Federal	State	Local	Other
2000	222,000	405,000	0.0	150,000
2001	229,000	418,000	0.0	154,000
2002	236,000	430,000	0.0	159,000
2003	243,000	443,000	0.0	163,000

2004	250,000	456,000	0.0	168,000
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Extension FTE's

Year	Professional			Paraprofessional		
	1862	1890	Other	1862	1890	Other
2000	26.3	0.4	0.0	52.1	0.0	0.0
2001	26.3	0.4	0.0	52.1	0.0	0.0
2002	26.3	0.4	0.0	52.1	0.0	0.0
2003	26.3	0.4	0.0	52.1	0.0	0.0
2004	26.3	0.4	0.0	52.1	0.0	0.0

Research SY's Only

Year	1862	1890	Other
2000	2.1	0.0	0.0
2001	2.1	0.0	0.0
2002	2.1	0.0	0.0
2003	2.1	0.0	0.0
2004	2.1	0.0	0.0

Goal 4: To achieve greater harmony (balance) between agriculture (production activities) and (stewardship and protection of) the environment.

Statement of issue(s)

Farms have enlarged significantly and agriculture and forestry have become more intensive. Soil erosion and sedimentation continue to be a major source of concern. In addition, nutrients and other chemicals used in agricultural and forestry operations are contaminating surface and ground water supplies to unacceptable levels. Studies have shown nonpoint sources (NPS) are responsible for a majority of water pollution problems. As agriculture has become intensive and production increased, society has become concerned about air and water quality. Scientists supporting food and fiber production must now develop new approaches to combat the associated pollution problems. Agricultural and forestry production practices must achieve greater harmony with the environment. Making use of cutting edge technologies, scientists at Virginia Tech and Virginia State will develop best management practices (BMPs) to control nutrients and sedimentation in runoff and improve the productivity of estuaries. They must also develop new procedures for managing and utilizing the wastes from production and processing of food and fiber to improve the quality of surface and ground water supplies.

The 4-H Marine/Aquatic Education Program (at Virginia State) and the Virginia 4-H Environmental Education and Natural Resources Curriculum Component Committee recognize that growing population and consumer demands are placing an unprecedented stress on our natural resources. Demands for food, wood products, consumer products and land for commercial and residential development are forcing producers and consumers to look for new programs, technologies, and practices that will sustain natural resource supplies for the future. There is a pressing need to educate and train producers and consumers in effective, best management practices aimed at natural resource sustainability. Producers must balance economic viability with resource conservation and protection. Consumers must balance consumption and life-style habits with environmental stewardship commitment. The over-riding need to protect and conserve natural resources to insure good environmental quality must be incorporated in education and training programs for both producers and consumers.

Performance goal(s); output/outcome indicators; evaluation framework

OBJECTIVE 1: To develop, transfer, and promote the adoption of efficient and sustainable agricultural, forestry, and other resource conservation policies, programs, technologies, and practices, which may include alternative agricultural enterprises, that ensure ecosystems achieve a sustainable balance of agricultural activities and biodiversity.

Performance goal 1: To annually increase the research and knowledge-base available from CSREES partners and cooperators on environmental sciences and agriculture, including conserving, maintaining, and protecting ecosystem integrity and biodiversity.

Indicators: Number and type of significant research underway or proposed on environmental sciences and related topics.

Evaluation framework: CRIS reports will be examined to document significant research underway or proposed on environmental sciences and related topics.

Performance goal 2: To annually increase agricultural producer awareness, understanding, and information regarding the adoption of agricultural production practices that sustain and/or protect ecosystem integrity and biodiversity in which CSREES partners and cooperators play an active research, education, and extension role.

Indicators: The total number of persons participating in non-formal education programs on sustaining and protecting ecosystem biodiversity while sustaining the profitability of agricultural production systems.

Evaluation framework: Data to document achievement of this performance goal will come from the VCE Planning and Reporting System.

OBJECTIVE 2: To develop, transfer, and promote adoption of efficient and sustainable agricultural, forestry, and other resource policies, programs, technologies, and practices that protect, sustain, and enhance water, soil and air resources.

Performance goal 1: To annually increase producer adoption of agricultural production practices that conserve and/or protect surface and groundwater supplies on or adjacent to agricultural production sites or land uses.

Indicators: The total number of persons participating in non-formal education programs on sustaining and/or protecting the quantity and quality of surface water and ground water supplies.

Evaluation framework: Data to document achievement of this performance goal will come from the VCE Planning and Reporting System.

Performance goal 2: To annually increase producer adoption of agricultural production "best practices" that conserve, protect, and/or enhance the soil resources on or adjacent to agricultural production sites or land uses.

Indicators: The total number of persons participating in non-formal education programs on conserving, sustaining, and/or protecting soil resources.

Evaluation framework: Data to document achievement of this performance goal will come from the VCE Planning and Reporting System.

Performance goal 3: To annually increase the research and knowledge-base available from CSREES partners and cooperators on agricultural practices that protect, sustain, and enhance water, soil, and air resources.

Indicators: Number and type of significant research underway or proposed on agricultural technologies and practices that protect, sustain, and/or enhance water, soil, and air resources.

Evaluation framework: CRIS reports will be examined to document significant research underway or proposed on agricultural technologies and practices that protect, sustain, and/or enhance water, soil, and air resources.

OBJECTIVE 3: To improve decision making on public policies related to agriculture and the environment.

Performance goal 1: To annually increase the research and knowledge-base available from CSREES partners and cooperators on public policy issues affecting agricultural production, the environment, and ecosystem integrity and biodiversity.

Indicators: Number and type of significant research underway or proposed on public policy issues affecting agricultural production, the environment, and ecosystem integrity and biodiversity.

Evaluation framework: CRIS reports will be examined to document significant research underway or proposed on public policy issues affecting agricultural production, the environment, and ecosystem integrity and biodiversity.

Performance goal 2: To annually increase the effectiveness of constituent and citizen participation on public policy issues affecting agricultural production, the environment, and ecosystem integrity and biodiversity.

Indicators: The total number of persons participating in non-formal education programs on public policy issues affecting agricultural production and ecosystem integrity and biodiversity.

Evaluation framework: Data to document achievement of this performance goal will come from the VCE Planning and Reporting System.

Key program component(s)

Many different strategies and applications of new technologies may be necessary to accomplish the overall goal of achieving greater harmony between agricultural and forestry operations and the environment. Long-term field monitoring effort should continue to be used to assess the effect of land use on both ground and surface water quality. Dependable information from such field studies is essential to develop BMPs which reduce NPS pollution. Over the years, many BMPs have been developed. Selected examples include the following: (a) integrated pest management, (b) animal waste control structures, (c) buffer strip cropping, (d) grass filter strips, (e) erosion, water control and treatment structures, (f) stream protection, (g) nutrient management, (h) storm water retention ponds, and (i) constructed wetlands.

This effort to develop more effective BMPs must continue. Numerous factors such as land use, climatic conditions, soil conditions, and geographic conditions influence the effectiveness of BMPs. Appropriate procedures for evaluating BMPs must be developed. One obvious approach would be to conduct full scale field studies to accomplish this goal. Small scale studies with rainfall simulators have also been used to approach the same goal. These

experimental approaches are generally expensive because of the time and labor involved. One cost-effective way of accomplishing the same goal is to use mathematical models to evaluate different BMPs. This approach has been used successfully in the past under different situations. However, the success of this approach will depend heavily on the availability of realistic mathematical models to represent the system. Therefore, it is important that efforts are continued to improve existing and to develop new models.

As new technologies become available, they can be put to use to develop new and more effective BMPs which reduce the pollution load. One such example is the "Precision Farming" and "Precision Forestry" approach. Field trials are in progress in Virginia to match the rate of application of nutrients with the yield potential of soils utilizing Geographic Information Systems (GIS) and Global Positioning Systems (GPS) technologies. This approach, if successful, has the potential to minimize pollution and improve profitability through reduced use of nutrients. Potential uses of other cutting edge technologies such as "computer or machine vision" for improving water quality should also be evaluated. This technology has the potential to reduce the chemicals used to control weeds and pests by controlling the location and rate of application based on demand.

Management of wastes from intensive production and processing facilities will continue to play an important role in advancing greater harmony between agricultural and forestry operations and the environment. While developing new and more effective management technologies, research on the utilization of this waste as a nutrient source for crop production and converting it into revenue generating byproducts must also continue. Research to minimize both the quantity and potency of waste through dietary changes is also important.

A key principle of sustainability is to recycle renewable resources and minimize the use of nonrenewable resources. Modern commercial agriculture has been dependent on petroleum-based sources of nitrogen and mined and industrially-processed sources of other nutrients to increase the fertility of its soils. Recycling of organic wastes onto soils may improve the soil chemical, physical and biological properties, which increase soil productivity and enhance environmental quality.

Major emphasis in recent years has been placed on teaching and encouraging farmers to utilize wastes as fertilizer. As profit margins stagnate, or become smaller, there is a need to develop treatment and handling alternatives that convert wastes into profitable by-products. It is important that these by-products are attractive and can be cost-effectively used on the farm, or can be sold and moved to other areas for utilization as fertilizer, organic soil amendments, or to replace energy generated from traditional fuels.

Odors from livestock farms often create major conflicts between farmers and their urban and suburban neighbors, and gases released from buildings and manure storage structures have been implicated in Europe as contributors to acid rain. So far little attention has been given to

this potential problem in the U.S. Because of the likely odor conflict between livestock production and non-farming neighbors, zoning authorities are increasingly considering imposition of significant setbacks for large production systems from neighboring residences and developments. Farmers are often unable to meet these requirements, and are frequently hindered in assembling economically viable livestock growing operations because of possible odor generation. Methods of treating and managing agricultural wastes are needed to allow farming and other neighbors to satisfactorily coexist.

Composting offers a biological tool for converting raw wastes to more manageable, safer, and higher quality products. Unstable organic wastes, the typical form in municipal solid wastes and agricultural wastes, are putrescible and storage results in potential water quality impacts, odors, and disease transmission. Manure management is a major inducement for on-farm composting, because storing and handling composted manure is more convenient.

Farm-generated wastes and non-farm food, food and fiber processing, and fermentation wastes are difficult to compost by themselves due to their high N and moisture contents, which lead to rapid depletion of oxygen in the pile and production of odors. A balanced carbon to nitrogen ratio is necessary to achieve high processing temperatures, low odor, and rapid decomposition of organic materials. Non-agricultural wastes, such as yard wastes, paper mill sludges, sawdust, and other woody wastes, are high in carbon and often low in moisture. The combination of wastes from rural, suburban and urban areas has the potential of generating compost to produce a very high quality final material for use by individuals, local communities, and industries.

Producers of food and fiber must be educated to facilitate voluntary adoption of BMPs. This educational effort will be most effective if carried out through a variety of means including publications, which are an important mechanism for disseminating information. Media opportunities must also be utilized to the fullest extent possible. In addition, field days and innovative demonstrations are needed to get improved methods into practice. In order to gain initial participation, workshops, demonstrations, and field days must be widely advertised well in advance of the offering. Programs which allow a participant to “buy-in”, such as water testing opportunities and Farm*A*Syst, can be especially effective.

Internal and External linkages

Federal, state, private and nonprofit agencies will be involved in the planning and implementation of projects. Such agencies will include, USDA's Natural Resources Conservation Service (NRCS), Virginia Department of Environmental Quality (DEQ), and Virginia Department of Agriculture and Consumer Services (VDACS). Internally, project objectives will be implemented in collaboration with Cooperative Extension and the Experiment Station. The NRCS provides expertise and material support in all phases of project implementation. State agencies such as DEQ and VDACS participate in prioritizing research, provide technical assistance and cooperate in developing research proposals.

Target audiences

Target audiences or customers will include farmers, the general public, agricultural business, and students. An important target of the research will be small and limited resource farmers/producers. Customers will be involved in program development and implementation. Results will be disseminated through Virginia Cooperative Extension.

Program duration

Long term program (2000-2004).

Allocated resources

Extension Funding

Year	Federal	State	Local	Other
2000	1,194,104	3,336,471	599,060	506,663
2001	1,229,927	3,436,565	617,032	521,863
2002	1,266,825	3,539,662	635,543	537,519
2003	1,304,830	3,645,852	654,609	553,645
2004	1,343,975	3,755,228	674,247	570,254

Research Funding

Year	Federal	State	Local	Other
2000	2,585,000	4,072,000	0.0	1,458,000
2001	2,650,000	4,191,000	0.0	1,502,000
2002	2,716,000	4,313,000	0.0	1,547,000
2003	2,785,000	4,439,000	0.0	1,593,000
2004	2,856,000	4,568,000	0.0	1,641,000

Extension FTE's

Year	Professional			Paraprofessional		
	1862	1890	Other	1862	1890	Other
2000	54.8	0.6	0.0	1.6	0.1	0.0
2001	54.8	0.6	0.0	1.6	0.1	0.0
2002	54.8	0.6	0.0	1.6	0.1	0.0
2003	54.8	0.6	0.0	1.6	0.1	0.0
2004	54.8	0.6	0.0	1.6	0.1	0.0

Research SY's Only

Year	1862	1890	Other
2000	21.1	2.11	0.0
2001	21.3	2.11	0.0
2002	21.5	2.11	0.0
2003	21.7	2.11	0.0
2004	21.9	2.11	0.0

Goal 5: To enhance economic opportunities and the quality of life among families and communities.

Statement of issue(s)

Communities throughout Virginia are experiencing serious economic problems. Contributing to these problems in certain communities is the high unemployment rate--a double-digit figure for a number of localities. Per capita income in Virginia, which on average is \$20,046, ranges from a low of \$11,715 in Lee County to a high of \$32,409 in Alexandria, according to 1991 statistics. Approximately 10% of the total population have incomes below the poverty level. Localities differ considerably in the percentage of families in poverty, ranging from a high of 32% in one locality to a low of 3% in another. In 1992, twenty-three percent of children in Virginia were in families with incomes below 150% of the poverty level, and 13% of children had no health insurance. Twenty-two percent of Virginia's children are in families headed by a single parent, usually the female parent. Since the mean taxable wage of females (\$20,752) is considerably below that of males (\$34,356), economic conditions for children in single female parent homes are even more severe.

Although our nation and the Commonwealth continue to experience a time of economic growth, many families and individuals are facing difficult economic times personally. Layoffs and business restructuring continue across the State. Many people who lose jobs find replacement jobs that are lower paying positions with reduced benefits, creating additional financial stress and difficulty in meeting obligations. Bankruptcy rates have soared in recent years and, in 1996 reached an all-time high, especially in Southwest Virginia. Most bankruptcy filings continue to be for liquidation rather than repayment. Thus, when a family faces bankruptcy, the resulting financial disaster affects the community as well as the individual family. Many forced off welfare rolls are struggling to make ends meet with minimum wage jobs and no benefits. Levels of outstanding credit continue to grow. Micro- and Home-Based businesses are growing means to help families increase their income.

Housing remains the single largest asset of most citizens, thus proper maintenance and care of this asset is critical, including assuring safe air quality and water supply. Those who do not own housing need education to prepare for this responsibility. Thousands of Virginians have an imminent need to learn to comparison shop for and appropriately manage bank accounts. Citizens are increasingly responsible for financing their own retirements, but few have basic knowledge and skill in this area. Meanwhile, our marketplace relies increasingly on competition with options exploding, requiring increasing consumer attention and decisions. Research shows that education is needed to help micro and home business owners develop business management skills and that when employees have personal financial programs, they negatively affect the employer's bottom line. It also shows that the level of consumer knowledge in our society is frighteningly low. However, there is little consumer education offered in our school

systems to prepare citizens for these challenges. Non-formal, community-based education is needed.

Many local government officials, both elected and appointed, volunteer and paid, do not have sufficient information or training to equip them with the knowledge and skills needed to perform their public service roles and responsibilities. This lack of information and training has a negative effect on their ability to make informed decisions related to fiscal and human resource management, strategic community economic development planning, and overall government operations. Finally, many community residents, both adults and youth, do not have the necessary information and knowledge base to participate effectively as informed citizens.

Virginia has 325 local governments (counties, cities and towns) approximately 1,800 elected officials, 220 top-level managers, 2,500 upper-level managers, and 20,000 citizens appointed to local government boards, committees and commissions. The turnover rate among elected officials is estimated to be 40% (650) every four years. Approximately 10% (2,000) new appointments are made annually to boards, committees and commissions. Most serve without the benefit of formal training or orientation for the positions that they hold. Because local governments are likely to face increasingly difficult challenges and changes due to the complexity of their operating environments, it will be more important than ever before for them to function effectively and efficiently. In addition to the high turnover rate, other challenges to be faced include changes in: economic conditions; federal, state and local relationships; federal and state mandates; population distribution; technology; public expectations; land settlement patterns; demands for services; and many other critical issues.

Many communities are having difficulty maintaining infrastructure and an able leadership base to accommodate citizens' needs. Community leaders lack knowledge, skills and experience in long range planning, collaborative decision-making and the development of partnerships for sustainability. They have great difficulty in knowing what kind of analytical information they require for decision making, and how to interpret information when they do get it.

Local and regional community leaders, planners, business leaders, economic developers and entrepreneurs in Virginia communities have looked to Virginia Cooperative Extension (VCE) to provide information, education and technical assistance and linkages for economic and business development, and leadership development and training. Throughout the Commonwealth, VCE is strategically poised to continue addressing economic development needs and to provide analysis of community economic problems in a changing environment. Therefore, VCE develops and delivers research-based information, training and technical assistance, that contributes directly to local and state officials understanding and management of economic development activities and effective operation and management of communities throughout the Commonwealth.

4-H is the comprehensive youth development program of Virginia Cooperative Extension. Youth between the ages of 5 and 18 engage in hands-on learning experiences under the guidance of adult or teen 4-H volunteers trained by 4-H agents. 4-H programs use experiential learning opportunities to teach the latest research based subject matter knowledge and to foster skill development in effective citizenship, leadership, and other life skills. The ten areas of 4-H curriculum focus are: Animal sciences; Communications and Expressive Arts; Environmental Education and Natural Resources; Jobs, Careers and Economics; Plant and Soil Sciences; Citizenship; Consumer and Family Sciences; Health, Nutrition and Wellness; Leadership and Personal Development; and Science and Technology. Youth also participate in educational experiences at six 4-H educational centers. 4-H has both a school based delivery model and a community based delivery model so maximum access to Virginia's youth is provided. The specific learning experiences a 4-H member participates in are shaped locally and supported at the state and national levels. 4-H members learn how to: make decisions, manage resources, work with others, and utilize effective communication skills. 4-H serves as an effective prevention educational program. Involvement in 4-H reduces the potential for dysfunctional behavior in the community by youth.

The following data compiled by the Virginia Commission on Youth in July, 1994, illustrate the potential savings as a result of prevention, and current costs are even higher. For example, a 10-week parenting class can be taught for approximately \$15, while a one-week stay in a runaway shelter costs \$60. Annual foster care maintenance costs for one child are calculated at \$3,845, while \$723 would purchase intensive in-home services for an at-risk child. Family preservation services can be purchased for about \$3,000 per family, but it costs about \$16,000 to support a child in residential care for a year. Taxpayers spend about \$37,000 per child in annual learning center placements, while \$6,000 would serve one family in a court diversion program. According to the latest results of the Perry Preschool Study, for every \$1 spent in quality early childhood programs, \$7 is realized in future savings due to reduced need for special education services, reduced dependence on welfare, increased economic productivity and decreased crime and incarceration.

To improve prospects for sound youth development, young people need to be involved in local 4-H educational programs. Such 4-H programs focus on providing participants with positive adult and teen role models and engaging them in the 4-H learning model. Using the 4-H process of goal setting, cognition, practice and performance, youth develop the crucial life skills that enable them to avoid dysfunctional outcomes.

For Virginia's working families, the issue of adequate child care must also be confronted, and the growing need for adult day care for aging parents compounds the problem. The demand for caregiving resources for children and adults far exceeds the number of available slots. The impact of divorce has consequences for parenting and grandparenting, as well as for extended family and community relationships. The increasing incidence of family violence is well documented and illustrates the need for prevention education.

Virginia's families are confronted with a multitude of issues and problems that impact their ability to succeed economically and enhance family well-being. Some of these concerns are reflected in the statistics below.

- The rate of victims of child abuse and neglect increased eight percent from 1991 to 1996 (Statistical Report of Virginia's Child Protective Services Program 1991-1996, Virginia Department of Social Services)
- Births by Virginia's girls aged 15-17 in 1995 remained high with a rate of 33.6 per 1,000 (Virginia KIDS COUNT, 1996).
- The incidents of students possessing alcohol or drugs in school increased 43.0 percent from 1991-1995 (Virginia KIDS COUNT, 1996)
- The Juvenile arrest rate for violent crime increased 21.9 percent from 1991-1995 (Virginia KIDS COUNT, 1996).
- Although Virginia had an increase in the number of licensed day care providers of 8 percent in 1996 (Virginia KIDS COUNT, 1996) the quality and affordability of child care still remain issues.
- By the year 2030, there will be 65 million persons 65 years of age and older, 35 million more persons than there were in 1990 (Bouvier & De Vita, 1991).
- A three-year average from 1994-96 indicates that 11.1 percent of Virginia's population lives below the poverty line (<http://www.census.gov/hhes/poverty/poverty96/pv96state.html>)
- Families below poverty spend 21.1 percent of their income on child care
- (<http://www.census.gov/population/socdemo/child/cctab2.txt>).

Concerns about how Virginia's families are functioning, adjusting, and adapting to these problems have economic impacts for the individual family and the Commonwealth as a whole. Poor adjustment in children and youth is linked to negative outcomes in adulthood. Therefore, improving parenting skills and increasing the number and quality of affordable child care providers and centers is essential to family and child well-being, particularly for limited resource families. Reducing at risk behaviors for youth while at the same time promoting resiliency in children, youth, and families is essential in reducing financial and emotional costs to families and communities. The graying of our population will dramatically alter our society, and the Cooperative Extension System's Aging in America Task Force (Aging in America, 1993) recognizes this challenge by identifying broad issues and trends: economic, community services, family, health, continuing education and leadership development, housing and living arrangements, and public policy.

Improving the family's ability to function across the life span is a key ingredient to improving the standard of living and quality of life for Virginia's families. Research (Miller, Bishop, Epstein, Keitner, 1985,) indicates that families who function well are able to problem solve, communicate well, define family roles and boundaries, promote acceptable family behavior, and

respond appropriately emotionally. Therefore, educating families about healthy versus unhealthy family functioning is essential in improving overall family health and well-being.

The business community also has a stake in how well families are functioning, since employee absenteeism due to family related issues and/or problems can result in a less productive employee. Family issues such as lack of or poor quality child care, dealing with an aging family member, illnesses, domestic/family violence, and youth brushes with the law enforcement system take time and energy away from productivity.

To respond to the diverse needs of Virginia's families, Virginia Cooperative Extension addresses critical needs and provides educational programming that enables Virginia's families to meet the challenges before them.

VCE's goal is to improve family functioning throughout the life cycle by collaborative, integrative, educational programming in the areas of parenting, child development, child care, youth development, aging, and community development.

Performance goal(s); output/outcome indicators; evaluation framework

OBJECTIVE 1: To increase the capacity of communities and families to enhance their own economic well being.

Performance goal 1: To annually increase the research and knowledge-base available from CSREES partners and cooperators on the economic well-being of communities and their citizens.

Indicators: Number and type of significant research underway or proposed on economic well-being of consumers, families, and communities.

Evaluation framework: CRIS reports will be examined to document significant research underway or proposed on economic well-being of consumers, families, and communities.

Performance goal 2: To increase the capacity of local and state governments and their officials to effectively carry out their responsibilities, such as community strategic planning, zoning, other spatial and economic planning, land-use planning, and rural economic development, through programs in which CSREES partners and cooperators play an active research, education, and extension role.

Indicators: The number of public officials and community leaders participating in non-formal education programs on issues of government and rural economic development.

Evaluation framework: Data to document achievement of this performance goal will come from the VCE Planning and Reporting System and in-depth evaluations when available.

Performance goal 3: To annually improve the financial status of families through financial management education programs implemented in which CSREES partners and cooperators play an active research, education, or extension role.

Indicators: The number of persons participating in non-formal education program on financial management including home-based businesses.

Evaluation framework: Data to document achievement of this performance goal will come from the VCE Planning and Reporting System and in-depth evaluations when available.

OBJECTIVE 2: To increase the capacity of communities, families, and individuals to improve their own quality of life.

Performance goal 1: To annually increase the incidence of caring communities resulting from non-formal education programs in which CSREES partners and cooperators, play an active research, education, or extension role.

Indicators: The total number of persons participating in non-formal education programs on community decision-making and leadership development. The total number of dependent care providers participating in non-formal education programs on dependent care.

Evaluation framework: Data to document achievement of this performance goal will come from the VCE Planning and Reporting System and in-depth evaluations when available.

Performance goal 2: To annually increase the incidence of strong families resulting from non-formal education programs in which CSREES partners and cooperators play an active research, education, or extension role.

Indicators: The total number of persons participating in non-formal education programs on parenting. The total number of persons participating in non-formal education programs on youth development. ‘

Evaluation framework: Data to document achievement of this performance goal will come from the VCE Planning and Reporting System and in-depth evaluations when available.

Performance goal 3: To annually increase the research and knowledge base available from CSREES partners and cooperators on increasing the capacity of communities, families, and individuals to improve their own quality of life.

Indicators: Number and type of significant research underway or proposed that will result in increasing the capacity of communities, families, and individuals to improve their own quality of life.

Evaluation framework: CRIS reports will be examined to document significant research underway or proposed that will result in increasing the capacity of communities, families, and individuals to improve their own quality of life.

Key program component(s)

Over 12,000 citizens have left, or will leave, the welfare rolls as a result of welfare reform in Virginia. Department of Labor research indicates that families receiving public assistance have very different income and spending patterns that do others. For example, nearly 60% of spending by public assistance families was for food and housing while non-recipient families used only 47% of their resources for these essential items. Recipient families spent more on transportation and less on insurance. Former welfare recipients need to learn to effectively manage their lives, including their time and money, so that they can be successful in jobs. Money 2000 is a program designed to help citizens increase their financial well-being through increased savings and reduced household debt.

National research conducted by the Consumer Federation of America and American Express in 1990 documented the need for effective consumer education. Consumer knowledge was tested on matters of banking, insurance, housing, food, product safety, and durable goods. Consumers, on average, scored less than 60%. Generally, scores were higher on health and safety issues and lower on financial issues. The demand for consumer education was underscored by the test results. Because synthetic chemicals and materials have become an integral part of our lives, many residents are experiencing difficulties in using, storing and disposing of hazardous materials. Equipment used in the home, naturally occurring pollutants, excess moisture, biological pests and activities of residents contribute to environmental home hazards. In order to protect the health of the family, the environment, and the dwelling itself, consumers need to be educated about potential hazards in the home and how to improve their quality of life.

Another need identified at both the national and state levels is training in business management skills for current and potential home-based and micro business owners, both adult and youth. According to one recent study, one-fourth of all businesses fail within the first three years as a result of 1) failure to have a business plan; 2) inadequate working capital and cash flow; 3) financing problems; 4) lack of management skills; 5) errors in judgment; and 6) lack of knowledge, skills and desire. Basic employment skills are needed by women entrepreneurs, older adults on fixed incomes, and teens desiring to work. Those in transition as a result of welfare reform are particularly in need of employment and life management skills.

Virginia's 1.6 million families are also being confronted with other stressful situations. Over seventy percent of women in families with children under 18 are employed outside the home. Over 22% of Virginia's children live in single parent families and 17% of families are headed by single parents. Divorce has a direct impact on nearly 50% of all marriages. The 680,000 Virginians who are over 65 years of age experience additional stresses, and the issue of their care affects their families as well. Virginia's teen pregnancy rate in 1992 was 40.6% and 11% of all births that year were to teen mothers.

In FY 1994, 6,313 of Virginia's 1.5 million children were placed in foster care, 1,575 youth were admitted to juvenile correctional centers, and 1,750 juveniles were arrested for violent

crimes. Virginia ranks among the top 15 states in the nation in number of juvenile arrests. There are both direct and indirect costs to localities experiencing problems with resident youth, and the loss of the vast resources represented in the youth is very unfortunate and damaging. Many of the problems of the youth include violence against local citizens, vandalism, drug use, teen pregnancy, poor leadership, lack of responsibility, and inability to thrive in school. Localities have pointed to the need for youth to learn appropriate skills that will prevent dysfunctional and costly behavior.

Research indicates that youth problems such as those described above are actually symptoms of problems created by youth lacking vital life skills.

High rates of teen pregnancy, for example, are attributed to poor self-concept, poor decision making skills, poor adult role models, and inappropriate use of leisure time. Youth must be involved in programs and activities where they will experience success and learn these necessary life skills. Prevention, rather than remediation, is a more cost effective and a more positive approach to dealing with the problems of youth.

Internal and external linkages

In order to successfully improve Virginians' quality of life, numerous linkages with partners and collaborators are necessary. VCE enjoys strong relationships at both VT and VSU and across departments and entire colleges within the universities. In addition, external partners and collaborators include local governments, CSREES, Virginia government agencies such as Department of Social Services, Department of Health, Department of Education and the public schools. Others include child care centers and providers, banks, hospitals, AARP, economic development agencies, and the business community.

Target audiences

For Objective 1, which seeks to increase economic status of communities and families, the target audiences are: elected and appointed public officials; employees of local and state governmental agencies; community leaders; businesses; consumers; families; owners of small and home-based businesses; and individuals.

For Objective 2, which seeks to increase the capacity of communities and individuals to improve their own quality of life, the target audiences are: community leaders and decision makers; dependent care providers; youth and parents of youth; welfare recipients; foster parents; and individuals.

Program duration

Long term program (2000-2004).

Allocated resources

Virginia Tech and Virginia State University

Extension Funding

Year	Federal	State	Local	Other
2000	3,562,736	9,954,717	1,787,360	1,511,685
2001	3,669,618	10,253,359	1,840,981	1,557,036
2002	3,779,707	10,560,960	1,896,210	1,603,747
2003	3,893,098	10,877,789	1,953,096	1,651,859
2004	4,009,891	11,204,123	2,011,689	1,701,415

Research Funding

Year	Federal	State	Local	Other
2000	902,000	1,647,000	0.0	607,000
2001	929,000	1,696,000	0.0	626,000
2002	957,000	1,747,000	0.0	644,000
2003	986,000	1,799,000	0.0	664,000
2004	1,015,000	1,853,000	0.0	684,000

Extension FTE's

Year	Professional			Paraprofessional		
	1862	1890	Other	1862	1890	Other
2000	141.5	7.0	0.0	8.9	12.0	0.0
2001	141.5	7.0	0.0	8.9	12.0	0.0
2002	141.5	7.0	0.0	8.9	12.0	0.0
2003	141.5	7.0	0.0	8.9	12.0	0.0
2004	141.5	7.0	0.0	8.9	12.0	0.0

Research SY's Only

Year	1862	1890	Other
2000	8.8	0.0	0.0
2001	8.9	0.0	0.0
2002	9.0	0.0	0.0
2003	9.1	0.0	0.0
2004	9.2	0.0	0.0

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APPENDIX A

Virginia Cooperative Extension Civil Rights Plan 2000-2004

Civil Rights

Virginia Cooperative Extension (VCE) has demonstrated a strong commitment to the enhancement of equal opportunity and diversity in employment, programs, and collaborative efforts with volunteers. To continue building upon this commitment, VCE has implemented strategies that have yielded results, which are outlined below under the areas of Equal Employment Opportunity, Program Delivery, Public Notification, and Civil Rights Training and Onsite Civil Rights Reviews.

Equal Opportunity Employment

VCE does not discriminate against employees or applicants on the basis of race, sex, disability, age, veteran status, national origin, religion, political affiliation, or sexual orientation and strives to employ personnel that is representative of state demographics. The successful recruitment and hiring of non-traditional Extension agents became more challenging with the requirement of a master's degree on July 1, 1996. Therefore, a proactive plan for recruiting a diverse workforce has been implemented which includes recruitment at university career fairs, including historically black colleges and universities. To assist in this area, a .75% fte restricted faculty position was established and titled Opportunity Development Specialist. In addition to recruitment, this position has responsibilities in other areas that will be described later in the report.

All agent position announcements are distributed to members of the VCE Leadership Council (ELC) which is comprised of diverse elected and at-large representatives from the 22 Planning Districts in Virginia. The ELC mission is to advance and promote the educational programs of VCE. The ELC has taken an active role in recruiting and hiring faculty and staff for conducting educational programs in the counties and cities by identifying and recommending successful candidates for employment.

State and district administrators have the responsibility of identifying potential non-traditional agents through networking at meetings, conferences and through individual communications with peers, other Extension employees, and clientele. Specific plans are in place to strengthen the process in the future with the convening of a state employee recruitment committee. The committee is comprised of a state and district administrator and agents with the charge of evaluating VCE's existing recruitment and retention efforts to determine future directions in this area. A specific expectation of the committee is to develop strategies for replacing the

relatively large number of agents that will be retiring over the next five years. Proportionally, this group will include a significant number of women and minorities.

Program Delivery

For over thirty years, VCE has operated as a joint program of Virginia State and Virginia Tech. While each university has its particular program strengths, program delivery at the local level constitutes a unified approach. The strength behind extension agents and specialists delivering programs to the people is the network of local Extension Leadership Councils which assist in the identification of local needs and development and delivery of educational programs. Extension Leadership Councils must have members who represent the diversity in the communities served. VCE refuses to provide programs to or to collaborate with other organizations that do not have nondiscrimination policies. "All reasonable efforts" are made and documented by Extension to ensure that underrepresented clientele are involved in its programs. Virginia Cooperative Extension continues to depend on specific strategies to include these audiences in its programs. Face to face contacts, marketing programs in minority media, strategic location of meetings and classes, and the promoting of programs through minority places of worship continue to be successful means of recruiting difficult-to-reach participants.

Cooperative Extension in Virginia works in partnership with research at both Virginia Tech and Virginia State. Research programs at both universities were reviewed along with Extension during the December, 1996 CSREES Civil Rights Review. The outreach function of research is primarily carried out by extension, in that research provides the unbiased information used by extension agents to assist the people of the state.

Public Notification

VCE requires that significant efforts be made to notify clientele of its equal opportunity, non-discrimination policies. Among the numerous methods of public notification are the following examples:

- equal opportunity/non-discrimination statements are required in all publications, on letterhead, applications, and in any other printed materials
- volunteers in extension and other programs are informed of the requirement that they comply with civil rights principles
- required signage and posters, including the posters "...And Justice for All," and Know Your Rights, displayed in conspicuous places in all major workplace locations
- pictures in catalogs, extension produced videos and publications, research bulletins and other similar publications reflect diversity in programming, and employment

- a standardized ADA statement to ensure accommodation for the disabled is prominent in all materials promoting programs or services
- unit extension offices use mailing lists of local churches and civic groups with large minority membership to promote programs and employment
- position descriptions for all extension agent positions have been updated to include responsibility for programming in accordance with EEO/AA/CR guidelines.
- civil rights commitment will continue to be emphasized in presentations universities.

Civil Rights Training and On-site Civil Rights Reviews:

Civil Rights Training programs have been conducted system-wide for employees and volunteers. Training is conducted at least annually by extension and, for specific topics, is conducted more frequently. Such training sessions have focused on recruitment and retention, outreach to underrepresented audiences, racial and gender diversity, sexual harassment, accommodations for the disabled, and cultural diversity in the workplace and within communities.

Every extension agent and specialist receives civil rights training during their new employee orientation program and during in-service training sessions. The annual extension fall conference for all professional employees contains workshops on civil rights topics.

Supervisors who conduct extension agent performance evaluations are trained to evaluate the specific requirement which reads: "Evidence of a commitment to working with diverse clientele and colleagues and a willingness to further the civil rights program of Virginia Cooperative Extension." On an on-going basis, department heads and district directors review compliance progress with individual faculty conducting research and extension programs.

Virginia Cooperative Extension has formed a Civil Rights Committee charged with providing leadership and input to the administrative and support staff responsible for civil rights program implementation. This committee assists in the evaluation of efforts and the design of new areas of emphasis.

To continue building upon existing training efforts, VCE has developed a new internal civil rights review process designed to investigate documented efforts and results related to compliance and to further educate employees in the areas of civil rights compliance and program outreach. By June 1, 1999, VCE will have conducted internal civil rights reviews in twelve Extension unit offices, one Experiment Station, and one 4-H Center.

The new review process involves the State Leader for Personnel and Benefits, the Opportunity Development Specialist, the district director responsible for the unit being reviewed, and three agents, according to program area. New agents are assigned to the team for each review

which exposes a greater number to the process. All staff are involved in intimate question and answer dialog during the morning session followed by individual interviews in the afternoon. The team has an exit meeting with the entire staff and shares tentative finding and recommendations. After review team members return to their respective work sites, they forward individuals written findings and recommendations to the state level where they are compiled and sent to the unit. The district director reviews the information and is responsible for follow-up with the unit to ensure the recommendations are acted upon. The process has received accolades from members of the review teams as well as from employees in the units that were reviewed. It has been requested by and shared with other states that are preparing to do internal civil rights compliance reviews.

A Civil Rights Compliance Manual was developed for the off-campus Agricultural Research and Extension Centers (ARECs) and a pilot Civil Rights compliance review and training session was held at one AREC in FY99. At least one compliance/training session will be held annually at an AREC during the next five years.

APPENDIX B

Virginia Tech and Virginia State University Extension 3d Funded Programs Plan of Work: 2000-2004

**Note: 3d Plans and Reports will be modified when new guidelines are received from
CSREES**

EFNEP

Statement of issue(s)

Adult EFNEP: Poverty, low participation in food programs, and general deprivation of resources are widely accepted as major causes of malnutrition and hunger throughout the U.S. and in Virginia. The 1990 Census data showed Virginia as having a population of 6,187,358 individuals, with 10% (611,596) living in poverty. Approximately 8% of families (126,897) are in poverty. Fifty-two percent of those in poverty in Virginia are African-American and 46% are white. Among young children, poverty is a growing problem with one study finding a national rate of 33% in urban and 22% in rural areas. In 1994, 6% (96,750) Of Virginia's children under age 18 years were in extreme poverty (income below 50% of poverty); while 13% of children (209,625) in the Commonwealth are at or below the poverty level.

Malnutrition and hunger are major risk factors in poor outcome of pregnancy, such as low-birth weights, high infant mortality, increased birth defects and neurological problems. In 1994, Virginia's rate of low-birth-weight among infants was 7.5 (the non-white rate was 11.8) which is slightly worse than the national rate of 6.8%. The infant mortality rate was 8.3 in 1994 (Kids Count Data Book, 1997, The Annie E. Casey Foundation). Other detrimental effects of malnutrition include reduced ability to concentrate, poor general health, reduced vitality, increased chronic disease risks, and decreased longevity.

Five diet-related diseases (heart disease, cancer, stroke, diabetes, and atherosclerosis) accounted for more than 32,000 deaths in Virginia in 1994 (Virginia Vital Statistics, 1994). These chronic diseases and conditions are more prevalent among low-income people. This

population group is least able to bear the financial burden of a chronic disease, as a majority does not have health insurance and decreasing numbers are on Medicaid due to welfare reform. If a low-income family had a member with one of the above chronic diseases and did not have insurance, Medicare, or Medicaid, they would soon be hopelessly in debt as the cost of medical care ranges from \$22,000 per year for stroke to \$30,000 per year for heart disease. A recent Cost Benefit Analysis (CBA) of the Virginia EFNEP (based on 1996 data) indicates that, for every \$1 spent to implement EFNEP, a benefit of \$10.64 may be saved on future health-care cost.

In addition to major health risks suffered by the general population, there exists among limited-resource families certain barriers to nutrition and health education and to the family's own efforts of self-care. The following barriers further increase the chronic disease and malnutrition risk of limited-resource families: (a) low level of formal education of adults and high functional illiteracy, (b) low level of job skills and holding low-paying jobs with little chance of advancement (especially among female heads of households), (c) very poor housing with inadequate sanitation and cooking facilities, (d) lack of transportation, (e) low level of medical insurance and access to health care, (f) distrust of government agencies designed to help them, (g) lack of knowledge and/or motivation needed to seek services and better employment, (h) complacency and/or hopelessness felt by the individual and/or society, and (i) general low level of knowledge and skills needed to practice good nutrition and preventive health measures. To work with these hard-to-reach families, EFNEP uses a multidimensional approach to nutrition-related problems through education of homemakers in individual or small group settings and education of youth in a variety of group settings.

4-H EFNEP Youth Program: Malnutrition and hunger are major risk factors in increased birth defects and neurological problems, reduced ability of children to concentrate, poor school performance, poor general health and reduced vitality among children and youth. National studies have shown that 10 to 15% of children of migratory workers and poor rural populations suffer growth retardation due to diet inadequacies. Iron deficiency anemia has been documented as a major problem among low-income children. Based on diets of enrolled EFNEP families during the past 20 years, low-income youth tend to have diets low in milk, vegetables and fruits, and high in sugar and fat. Obesity, a predisposing factor in hypertension, heart disease, and diabetes, is a growing problem among youth.

Teenage pregnancy adds another nutritional risk for youth. In 1993 there were 10,000 teen pregnancies in Virginia, with a large portion being from low-income families as evidenced by the number eligible for Medicaid, AFDC, and Food Stamps. The rate of low-birth-weight infants born to teens was 14.1. One study found that \$77 million was spent per year providing public assistance to females who had their first child as a teenager.

The following barriers increase the nutrition risk of low-income youth: (a) low level of formal education of parents (high incidence of functional illiteracy); (b) Parents having low level of job

skills and holding low paying jobs with little chance of advancement (especially among female heads of families); (c) very poor housing with lack of sanitation, privacy, and cooking facilities; (d) low level of medical insurance and access to health care; (e) lack of knowledge and/or motivation on part of parents to seek government services and better employment (f) lack of knowledge and skills necessary for good parenting. Low self-esteem and lack of encouragement from parents, resulting in low achievement of youth.

Regarding food and nutrient intake, the Healthy Eating Index (USDA, CNPP-1, 1995) indicated that less than 1/3 of people consume the recommended number of servings of milk and meat; while fewer than 20% consume the recommended servings of grains, vegetables, and fruits. Less than 20% of people achieve the Dietary Guidelines for fat intake, while less than 1/3 achieve the recommendations for variety in dietary patterns. People in households below the poverty level had index scores lower than the overall average of those assessed. Other studies have shown that a high percentage of low-income individuals have deficient intakes of certain minerals (calcium, iron, potassium, and magnesium) and key vitamins (Vitamins A, C, B6, E and folate). Studies also show that the average fiber intake of most Americans, including low-income individuals, is about 10 - 12 grams/day; whereas, 20 - 35 grams per day are recommended.

Data collected on Virginia's EFNEP homemakers since 1992, using the EFNEP Reporting/Evaluation System (ERS), has shown that, on entering EFNEP, homemakers have inadequate intakes of Vegetables, Fruits, Milk, and Grains, as well as low intakes of Vitamins A and C, Calcium, iron, and dietary fiber. At the same time, they have higher-than-recommended intakes of total fat and the Fats/Sweets Group. Many homemakers report that their food resources do not last for the entire month and they either run out of food or have to depend on emergency sources, or they are spending too large a portion of their resources on food.

Prior Accomplishments: On-going evaluation in EFNEP with ERS has demonstrated that homemakers and youth completing EFNEP have improved food intake and food-related behaviors. Statistically significant improvement in diets and food-related behaviors have been achieved by participation in 8 to 12 lessons, targeting the actual and perceived needs of clients. Lessons have included extensive use of visuals, hands-on experiences, and opportunities to prepare and taste low-cost, nutritious foods and recipes. With these methods, EFNEP in Virginia has proven to be very effective in bringing about nutrition-related change with an estimated 170,000 families and 290,000 youth in the past 30 years of operation.

Performance goal(s); output/outcome indicators; evaluation framework

Limited resource families (35,000 homemakers) and youth (50,400) in Virginia to gain skills and adopt improved food-related behavior necessary for the consumption of nutritious and healthy diets, within their available resources, and that would ultimately result in good health, optimal physical functioning, and reduced health care costs.

Output/Outcome indicators:

Indicators of improvement will consist of the Food Guide Pyramid recommended food servings, key nutrients, and food behaviors assessed by the national EFNEP Reporting and Evaluation System (ERS 4.0). Indicators for 4-H EFNEP will be the food-related behaviors measured by a new Youth Behavior Checklist recently developed in Virginia.

Evaluation framework:

Homemakers will be assessed at entry and exit from EFNEP using the forms and computer analysis system in ERS 4.0. Behavioral change among youth in each youth group will be assessed at entry and exit from 4-H EFNEP using a newly developed Youth Behavior Checklist. Numbers reached and demographic data will also be collected and summarized for homemakers, youth, PAs and volunteers through ERS 4.0.

Key program component(s)

EFNEP will continue to operate with the use of full-time paraprofessionals (Program Assistants or PAs) who will enroll limited-resource homemakers and youth into an educational program lasting about one year or less. Homemakers will be taught individually or in small groups, while youth will be taught only in groups within schools, in after-school programs, in day camps, and in neighborhood groups. Each homemaker or youth group will be offered a series of six or more food/nutrition lessons. Also, lessons will be offered to homemakers as a series of self-administered video lessons, especially if the homemaker works outside the home. In 4-H EFNEP, group leadership and lesson implementation will be conducted mainly by volunteers. Program assistants will recruit volunteer leaders and will assist in training and guiding them to teach the nutrition lessons. Training and supervision of PAs will be conducted by 5 Area EFNEP Coordinators, 21 Nutrition and Wellness Specialty Agents and by unit 4-H Agents.

Strategies:

1. Continue the operation of EFNEP in at least 25 Extension Units.
2. Search for additional sources of funding to allow for more paraprofessional positions.
3. Continue to use tested, effective curricula in teaching adult and youth EFNEP clients.
4. Continue to provide paraprofessionals (EFNEP Program Assistants) with excellent initial and in-service training on food/nutrition subject matter, background on target audience, program guidelines, and teaching methodology.
5. Develop, test, and/or implement innovative strategies for reaching more clients, while achieving desired behavior change.
6. Continue to improve the overall operation of the program for effectiveness and efficiency.
7. Expand the quality and number of lessons being taught to 4-H EFNEP Youth by providing needed curricula and guidance in using those curricula.

8. Improve and increase the use of volunteers to actually do the teaching in 4-H EFNEP groups, through improved volunteer recruitment and training.
9. Increase the number of youth continuing in 4-H through increased and improved collaboration between EFNEP staff and 4-H staff and greatly increased efforts to keep limited-resource youth involved in 4-H following the EFNEP phase.

Curricula and Materials:

EFNEP will continue to use tested, effective curricula in teaching adult and youth EFNEP clients that are based on the Food Guide Pyramid, Dietary Guidelines for Americans, and other research based information. Curricula for Adults will include Eating Right is Basic, 3rd edition (from Michigan) and Healthy Futures Series (Developed in Virginia). A video lesson series has been compiled and will be used to supplement or replace individual and small group visits homemakers. A study in Virginia indicated that this method is effective in bringing about behavior change and reduces the amount of paraprofessional time and cost with each homemaker.

Curriculum to be used in 4-H EFNEP: "A Planning Guide for Virginia 4-H EFNEP" has been prepared by the Assistant State Program Coordinator, which lists 13 topics addressing food/nutrition needs of youth (The Food Guide Pyramid, Variety in Foods, Breakfast, Grains, Vegetables, Fruits, Milk and Meat, Fats/Sweets Group, Fiber, Label Reading and Advertising, Snacks and Eating Out, Food Preparation/Food Safety, and Fitness/Physical Activity).

Lessons on the topics, appropriate for various age groups, have been identified for each topical area from various other curricula, including Eating Right Is Basic for Youth (Michigan EFNEP), Exploring the Food Guide Pyramid with Professor Popcorn Purdue EFNEP), Star Power (Washington State Apple Assoc.), Team Nutrition (USDA), Health Choices for the Future (Virginia EFNEP), Changing the Course (American Cancer Society), Chef Combo (Southeast United Dairy Industry Assoc.), and Munchsters (Virginia Cattle Industry Board). Based on a pre-assessment of each youth group, 4-H EFNEP Program Assistants will design an educational plan for each group by selecting lessons from the 13 core topics. They will then guide volunteer leaders to carry out the educational plan for each youth group. Changes in skills and food-related behaviors will be measured using a pre/post-assessment instrument.

Internal and external linkages

Internally, EFNEP paid staff will continue and/or expand their coordination and collaboration with Family and Consumer Science agents and specialists and with 4-H agents and specialists to improve the teaching of foods and nutrition to limited-resource adults and youth.

Collaboration of EFNEP Staff with Specialty Agents responsible for Resource Management and Family/Child Development will be expanded to develop ways of providing EFNEP families with education on non-nutrition topics. Collaboration with

4-H staff will be expanded to encourage 4-H EFNEP youth to remain in 4-H after the EFNEP phase ends.

External: The Virginia EFNEP has traditionally had good collaborative relationships with the school system, Headstart, WIC, and several other community agencies (varies with locality). These collaborations will be continued, while collaborations will be expanded with the Food Stamp Program, USDA Summer Feeding Programs, and member agencies of Food Banks (i.e. food pantries, soup kitchens. Etc.). There will also be an effort to develop collaboration and a referral system with primary care physicians and other health care givers so that low-income clients will be referred to EFNEP or FSNEP for "free" nutrition education. Since adult clients tend to listen to their physicians, it is believed that referrals from them to EFNEP would increase their willingness to enroll and as well as the amount of behavior change made.

Target audiences

-
The target population for Adult EFNEP will be limited-resource families having one or more of the following characteristics:

- a. Includes pregnant or breast-feeding women or teens
- b. At least one child age 12 years or younger
- c. Receives WIC, food stamps, or other government programs based on income eligibility
- d. Not receiving one of above programs, but reports an income of 135% of poverty or below
- e. Resides in one of the 25 to 30 localities having the EFNEP program

The target population for 4-H EFNEP will be limited resource youth as determined by one of the following:

- a. Attends school with at least 30% of students on free or reduced-price lunch.
- b. Resides in a low-income neighborhood
- c. Participates in Headstart and/or a USDA Summer Feeding Programs
- d. Fits into a, b, or c and is between the ages of 4 - 19 years.

Clients will be identified and referred to EFNEP with the following techniques:

- a. Referral from other agencies
- b. Neighborhood door-knocking by Program Assistants
- c. Collaborative programming with other agencies who work with low-income clients
- d. Referrals from health-care providers followed by individual visit by Program Assistant
- e. Referrals to local units from the toll-free hotline, followed by a home visit or phone contact by a Program Assistant.

Program duration

Duration for the current plan is 5 years, however, EFNEP is an on-going program using similar methods from year to year. Duration of program for each participant's involvement is 12 months or less for homemakers and 4-H EFNEP groups. A minimum of 6 contact hours of nutrition education will be provided to each homemaker or youth group, while most may participate in an average of 8 to 12 lessons. Program Assistants will be expected to graduate at least half of their caseload each reporting year and enroll close to 50% of caseload as new clients, thus, achieving a complete turnover about every 12 months.

Allocated resources

Extension Funding

Year	Federal	State	Local ¹	Other
2000	1,631,501	0.0	9200	0.0
2001	1,631,501	0.0	13800	0.0
2002	1,631,501	0.0	13800	0.0
2003	1,631,501	0.0	13800	0.0
2004	1,631,501	0.0	20000	0.0

¹Local funding is based on value of office space provided by local county and city governments .

Extension FTE's

Year	Professional			Paraprofessional		
	1862	1890	Other	1862	1890	Other
2000	4.0	0.0	0.0	58.0	0.0	0.0
2001	4.0	0.0	0.0	54.0	0.0	0.0
2002	4.0	0.0	0.0	50.0	0.0	0.0
2003	3.0	0.0	0.0	50.0	0.0	0.0
2004	3.0	0.0	0.0	50.0	0.0	0.0

Food Safety 3d Funded

Statement of issue(s)

While the American food supply is among the safest in the world, there are still millions (estimated twelve to twenty-one million) of Americans stricken by foodborne illness every year, and some 9,000 people a year die as a result (mostly the very young and elderly). The threats are many, ranging from Escherichia coli (E. coli) O157:H7 in meat and apple juice, to Salmonella in eggs, on chicken, in dairy products, and on produce, to Cyclospora and Cryptosporidium on fruit and in fruit juices, to hepatitis A virus in frozen strawberries.

According to the Centers for Disease Control (CDC) Five Year Summary of Foodborne Disease Outbreaks 1988-1992, the foodservice industry is the largest single source of reported foodborne illness outbreaks with 44%, followed by a distant second of food prepared at home (23%). The leading cause of foodborne illness is the mishandling of foods, allowing bacterial growth. The area of food safety is so important that the Clinton administration has proposed an ambitious, \$43-million Food Safety Initiative designed to strengthen and improve food safety practices and policies. The initiative includes expanded education efforts aimed at consumers, food service workers, and various other segments of the food community; enhanced food safety inspection and monitoring efforts; and an increase in research to develop new and more rapid detection methods and preventive techniques to increase food safety. The Department of Health and Human Services (FDA), the U.S. Department of Agriculture, and the Environmental Protection Agency prepared the report, "Food Safety From Farm To Table," which outlines recommendations on improving U.S. food safety. The centerpiece of the inspections segment of the initiative revolves around the HACCP (Hazard Analysis Critical Control Point) concept, a science-based preventive approach to safe food production. To improve food safety, issues must be addressed from "farm to table."

Performance goal(s); output/outcome indicators; evaluation framework

OBJECTIVE 1: To improve access to an affordable, healthful, and culturally relevant food supply.

Performance goal 1: To annually increase the research and knowledge-base available from CSREES partners and cooperators on food accessibility and affordability.

Indicators: Number and type of significant research underway or proposed on food accessibility and affordability.

Evaluation framework: CRIS reports will be examined to document significant research underway or proposed on food accessibility and affordability.

Performance goal 2: To annually increase consumer awareness, understanding, and information on food accessibility and affordability in which CSREES partners and cooperators plan an active research, education, or extension role.

Indicators: The total number of persons participating in non-formal consumer education programs on food access and food affordability.

Evaluation framework: Data to document achievement of this performance goal will come from the VCE Planning and Reporting System.

Performance goal 3: To increase the effectiveness of constituent and citizen participation on public policy issues affecting food security (i.e., food access, affordability, and recovery).

Indicators: The total number of persons participating in non-formal education programs on public policy issues affecting food security (i.e., food access, affordability, and recovery).

Evaluation framework: Data to document achievement of this performance goal will come from the VCE Planning and Reporting System.

OBJECTIVE 2: To improve food safety by controlling or eliminating food-borne risks.

Performance goal 1: To annually increase the research and knowledge-base available from CSREES partners and cooperators on food safety and food borne risks and illnesses.

Indicators: Number and type of significant research underway or proposed on food safety and food borne risks and illnesses.

Evaluation framework: CRIS reports will be examined to document significant research underway or proposed on food safety and food borne risks and illnesses.

Performance goal 2: To annually increase consumer awareness, understanding, and information regarding food safety and food borne risks and illnesses in which CSREES partners and cooperators play an active research, education, or extension role.

Indicators: The total number of persons participating in non-formal, consumer education programs on food safety and/or food borne risks and illnesses. The total number of individuals completing food handler certification programs conducted by CSREES partners and cooperators on an annual basis.

Evaluation framework: Data to document achievement of this performance goal will come from the VCE Planning and Reporting System.

Performance goal 3: To strengthen the capacity of higher education leaders in food sciences who will more effectively contribute to a greater understanding of food safety, including food borne risks and illnesses.

Indicators: The total number of students enrolled in formal courses in food sciences.

Evaluation framework: Annual student enrollment data.

Key program component(s)

Universities in general and Virginia Tech specifically have major roles in ensuring food safety through the research, teaching and extension programs. The prevention of foodborne illness is a major responsibility of food producers, processors, distributors, retailers and regulatory agencies. To meet the goal of producing safe food products for Virginia, national and international markets, Virginia Tech faculty have played a major role in developing internationally adopted principles and conducting training programs for producing safe food products. These principles which are called the Hazard Analysis Critical Control Points system (HACCP) serve as a basis for processors and regulatory agencies to identify hazards in producing foods, establishing critical control points in processing for hazard control and monitoring for assuring product safety. Research programs have addressed and will continue to

address rapid detection methods, predictive modeling systems for food safety, processing techniques to eliminate or reduce pathogens, development of procedures to prevent pathogen contamination, management practices, etc.

Food safety is addressed by extension through workshops with producers, processors, distributors, retailers and consumers. In addition, extension personnel work directly with each clientele group on food safety issues. Our undergraduate and graduate students are taught the principles of food safety in most classes including, food microbiology, food processing, advances in food microbiology, dairy processing, quality assurance, poultry processing, veterinary toxicology, (nearly all food animal veterinary courses have a food safety component) and many others. The Virginia-Maryland College of Veterinary Medicine has research, teaching and extension programs that ensure that animals entering the food supply are free of disease. The animals may still harbor organisms that are pathogenic to humans including Salmonellae, Cryptosporidium, E. coli 0157:H7 and others. Programs are on-going to develop better detection systems and ways to treat animals harboring pathogens. Food Science and Technology examines food safety issues during processing and develops intervention systems. This department has an active extension program to train processors, distributors, federal, state and local government inspectors, and others. The Department of Human Nutrition, Foods and Exercise Science works with consumers to promote food safety. The Department of Hospitality and Tourism works with all aspects of the food service industry to enhance food safety.

Internal and external linkages

Internal linkages in the area of food safety span the colleges of Agriculture and Life Sciences, Human Resources, Veterinary Medicine, Forestry and Wildlife, and Engineering. Joint projects among Departments within these colleges show internal linkages.

External linkages include the U.S. Meat and Poultry HACCP Alliance. Drs. Susan Sumner, Cameron Hackney, and Norman Marriott are certified instructors for meat and poultry HACCP. Merle Pierson, is Chair of the Institute of Food Technologists Committee on Codex Alimentarius. Codex Alimentarius with a membership representing 165 countries is responsible for developing international standards and principles for food quality and safety. Dr. Pierson serves as IFT's delegate to the Codex Committee on Food Hygiene. Dr. Michael Jahanke is also a CODEX representative. In addition, Dr. Pierson serves as Chair of the HACCP subcommittee of the National Advisory Committee on Microbiological Criteria for Foods (NACMCF). NACMCF members are appointed by the Secretary of Agriculture and the Secretary of Health and Human Services. This panel advises its sponsoring agencies (USDA, FDA, DoD, and DoC) on microbiological food safety issues. Drs. George Flick, Cameron Hackney and Merle Pierson are certified seafood HACCP instructors and Dr. Flick is a member of the Seafood HACCP Alliance, which in partnership with FDA trains all seafood processors and federal and state inspectors on seafood safety. Cameron Hackney

and Susan Sumner are approved instructors for the U.S. Poultry and Egg HACCP courses. Other external linkages include working with Debra Jones of Virginia State University on food safety issues. She is a member of Cooperative Extension's food safety committee. The faculty of Virginia Tech work extensively with the Virginia Department of Agriculture and Consumer Services and the Department of Public Health. State inspectors are trained in the latest food safety areas and they work with us on food safety laws and regulations. Finally, work will continue with national associations such as International Dairy Foods, National Food Processors, U.S. Fruit and many others. For example, the National Food Processors Association recently contributed over \$200,000 of equipment to Food Science and Technology to enhance food processing/safety research. Virginia Tech is working with their scientists on several food safety projects and have numerous joint publications and grants. Scientists from the associations often serve as committee members for graduate student research programs.

Target audiences

Food safety is an issue that affects everyone and must address issues from farm to table. Target audiences include students (undergraduate and graduate) producers, processors, distributors, extension agents, retailers, consumers and federal food inspectors. In addition, extension personnel work directly with each clientele group on food safety issues. University students are taught the principles of food safety in various classes. One of the primary classes (food microbiology) is being modified as a distance learning class. The lecture will be broadcast along with modular labs. Extension personnel will continue to develop workshops to train the target audiences. Successful state programs will be expanded to national audiences. We will work with national organizations to insure consistency of delivery materials.

Program duration

Long term program (2000-2004).

Allocated resources

Extension Funding

Year	Federal	State	Local	Other
2000	30000	0.0	0.0	0.0
2001	30000	0.0	0.0	0.0
2002	30000	0.0	0.0	0.0
2003	30000	0.0	0.0	0.0
2004	30000	0.0	0.0	0.0

Extension FTE's

Year	Professional			Paraprofessional		
	1862	1890	Other	1862	1890	Other
2000	2.3	0.0	0.0	0.5	0.0	0.0
2001	2.6	0.0	0.0	0.7	0.0	0.0
2002	2.6	0.0	0.0	0.7	0.0	0.0
2003	2.6	0.0	0.0	0.7	0.0	0.0
2004	2.6	0.0	0.0	0.7	0.0	0.0

Integrated Pest Management

Statement of issue(s)

Infestation of insects, diseases, weeds, nematodes and other pests results in significant crop and commodity losses every year. In addition, farmers, foresters, nurserymen, and homeowners apply tremendous amounts of pesticides to control these pests. Practices such as spraying broad-spectrum pesticides on a frequent or calendar schedule selects for pesticide resistance, can threaten farm-worker health, and affect water quality, non-target organisms, and the ecological integrity of ecosystems. As a result, yield, profits, and quality of life are reduced. Integrated pest management (IPM) has gained increased attention in recent years as a means to reduce commodity losses to pests, reduce the reliance on chemical pest controls, and to foster long-term sustainability of managed systems. IPM is a management approach that emphasizes information to make pest control decisions and integrates those decisions into sustainable, ecologically-based monitoring, predictive models and economic thresholds to aid in making decisions and integrating a set of control tactics. Examples of control tactics are pest-resistant plant varieties, crop rotations, inter-cropping, sanitation, promoting natural enemy populations, altering planting dates, and the selective use of pesticides when economically damaging pest densities are reached.

Currently, a significant number of Virginia farmers participate in some IPM practices. IPM has been a research and educational priority since the 1970's and many programs have been developed and promoted. IPM has had a significant impact on the numbers of crop acres treated with pesticides, the efficiency of product applications in terms of product selections, rate and application timing, and on the overall improved management of pests utilizing integrated approaches. These positive strides have been previously reported under IPM State reports. However, there are still many pests and crops for which specific strategies have not been developed, and many existing strategies that have not been adopted by a significant number of farmers. Lack of development of new practices is the result of the resources available, both personnel and funding. Reluctance of farmers to adopt existing practices is due to impediments that include: lack of confidence in new practices and the risk associated with them, lack of time or labor associated with additional decision-making requirements (e.g., scouting, sampling, pest identification, cultivating), shortage of trained field scouts or consultants, and a reluctance to pay for the required services.

The major driving force for the Virginia IPM Program is the goal set by USDA of having 75% of all farmed acreage managed using IPM by the year 2000. Increasing adoption of IPM is also viewed as providing long range improvement of environmental quality. A major strategy to reduce toxins in the Chesapeake Bay watershed includes the implementation of the IPM practices by farmers, homeowners and land managers. For widespread adoption by farmers to occur, IPM strategies must prove profitable and time-manageable. By definition and in practice, IPM strategies are usually more information and labor intensive than conventional

chemical-based pest control practices. In today's agricultural world, more than ever, time is money and producers are reluctant to participate in time consuming practices, such as field scouting, unless rewards are either clearly profitable, or practices are mandated. In Virginia, no IPM practices are mandated or legislated, only encouraged. Therefore, for our programs to be successfully adopted, many strategies over many years must be employed to both generate enough data to provide user confidence, and demonstrate practices through a variety of educational programs and information delivery media. Our challenge is to develop the most effective strategies, given limited resources, to move adoption of IPM towards mandated goals.

Performance goal(s); output/outcome indicators; evaluation framework

Objective 1: To safeguard human health and the environment through improved utilization of integrated pest management (IPM) strategies and systems among potential and potential and current clientele.

Goal 1: To improve utilization of IPM strategies and systems by potential and current clientele.

Indicator 1: The total number of production units that utilize at least one additional IPM product, service, tactic, or practice for selected commodities and/or at selected sites. (Annually increase by 2%.)

Goal 2: To minimize human and environmental exposures and risks to chemical pesticides through improved IPM decision-making by potential and current clientele.

Indicator 1: The diversity of IPM practices used by potential and current clientele for selected commodities and/or at selected sites. (Annually increase by 2%.)

Objective 2: To increase the range of benefits to enterprises and individuals through improved utilization of IPM strategies and systems among potential and current clientele.

Goal 1: To increase economic benefits and opportunities achieved through improved utilization of IPM strategies and systems among potential and current clientele.

Indicator 1: The total input costs or net return for selected commodities and/or at selected sites for identified clientele using IPM strategies and systems. (Input costs annually reduce by 2% or net return annually increases by 2)

Goal 2: To increase satisfaction with the results obtained from improved utilization of IPM strategies and systems among potential and current clientele.

- Indicator 1: The total number of IPM clients who are satisfied with the results obtained when utilizing IPM strategies and systems for selected commodities and/or at selected sites. (Annually increase by 2%, as measured through post-event satisfaction surveys.)
- Objective 3: To increase the supply and dissemination of knowledge and information about IPM strategies and systems for potential and current clientele.
- Goal 1: To increase the supply of information and knowledge about IPM strategies and systems to IPM staff, land-grant faculty, and other potential and current clientele.
- Indicator 1: The total number of new education and training materials incorporating information on the most effective IPM strategies and systems for use on selected commodities and/or at selected sites. (Annually increase by 2%.)
- Indicator 2: The total number of newly validated pest management products, services, tactics, or practices available for use on selected commodities and/or selected sites. (Annually increase by 1%.)
- Goal 2: To increase the dissemination of information and knowledge about IPM strategies and systems to IPM staff, land-grant faculty, and other potential and current clientele.
- Indicator 1: The total number of IPM education and training materials delivered to potential and current clientele for use on selected commodities and/or on selected sites. (Annually increase by 2%.)
- Indicator 2: The total number of people attending events, programs, and meetings on IPM related topics for selected commodities and/or at selected sites. (Annually increase by 1%.)
- Indicator 3: The total number of contact hours spent by land-grant university faculty and staff disseminating information and/or knowledge about the use of IPM strategies and systems for selected commodities and/or at selected sites. (Annually increase by 1%.)
- Objective 4: To enhance multi-party collaborations between public, private, and non-profit stakeholders that foster improved utilization of IPM strategies and systems among potential and current clientele.

- Goal 1: To improve and enhance the utilization of IPM strategies and systems among public, private, and non-profit stakeholders.
- Indicator 1: The total number of private sector personnel trained in the utilization of IPM strategies and systems for selected commodities and/or at selected sites. (Annually increase by 1%.)
- Goal 2: To promote the improved utilization of IPM strategies and systems through joint multi-party programs and activities.
- Indicator 1: The total number of public forums, committee meetings, conferences, and other venues of participation involving joint sponsorship or collaboration with the state IPM program and other agencies. (Annually increase by 1%.)

Key program component(s)

Educational strategies will include continued emphasis on traditional methods such as IPM meetings with clientele, workshops, in-service training for Extension Ag Agents, on-farm field plots and demonstrations, publication in Extension and public news media, and on-farm visits when appropriate. New innovations will focus on improvement of Web-based information development and delivery. Virginia is currently represented on the National IPM Network database and new Intranet (internal Virginia Cooperative Extension) sites are constructed with plant disease diagnostic keys, weed and insect identification and control recommendations, current advisories and IPM related newsletters. But not all crops and pest problems are addressed and there is much room for improvement. More information can be added and new linkages can be established with University, College of Agriculture and Life Sciences, Department and AREC (local Agricultural Research and Extension Centers) web pages. To achieve the greatest impact, Web-based information must be delivered to local pest control product sales and distribution centers, and to clients in their homes. Improvements are also planned for a southeastern Virginia Cotton/Peanut Infonet which can be accessed by local farmers through telephones to obtain specific and current information on crop pest advisories, forecasts, changes in recommendations, current weather data and frost advisories. This system is unique because it links weather stations across the region, gathering data daily, and provides on-line delivery of weather information and recommendations for pest management actions based on weather-based models.

Internal and external linkages

Development of new practices is dependent in large part on the availability of resources and priorities. Many projects are underway which have the potential, if adopted, to further the goals of IPM. These initiatives are not accomplished in a single year, but require consistent efforts over several years and over large geographic areas. Many of the current projects are

innovative as evidenced by their recognition in the research arena (awards in professional society meetings, publication in scientific literature). They include development of new pest thresholds, weather-based models for determining the need and best time for control treatments, risk indexes for predicting the need for preventive control treatments, and many others. These efforts must be sustained and, if possible, increased.

Current IPM efforts involve collaboration with several agencies or groups. Collaborative IPM research projects are underway with universities in Maryland, North Carolina, West Virginia, and Purdue. These are expected to continue and evolve as most are related to pest/crop problems that affect the mid-Atlantic states. Other collaborators include the Virginia, North Carolina, West Virginia, and Michigan Departments of Agriculture; the Virginia Peanut, Soybean, Small Grains, Corn and Cotton Production Associations; the Virginia Crop Consultants Association; the Virginia Department of Conservation and Recreation; the Virginia Chesapeake Bay Local Assistance Department; the Virginia Department of Environmental Quality, the Virginia Soil and Water Conservation Districts, the Virginia Farm Bureau, the Alliance for the Chesapeake Bay and many chemical, seed and fertilizer manufacturers. Some of these agencies or groups have and are expected to continue providing grant funds, volunteers, and in some cases developers and promoters of IPM programs. These relationships have been and will continue to be important in progressing towards IPM goals.

The multitude of information delivery strategies discussed above are designed so that each client group can be reached and educated about IPM, and encouraged to participate in scientifically-based, locally demonstrated, successful pest management strategies. Continued resources, funds and personnel are necessary if we are to increase the number of clients reached and maintain the positive gains already made with existing IPM programs. All historical literature on IPM adoption and sustainability emphasizes that for success, people must be 'touched' and supported by sources they perceive as confident. The Virginia IPM Program strives to provide this element.

Target audiences

The primary target audience of the Virginia IPM Program is the clientele associated with decision making regarding control of pests of farm crops, forests, nurseries, turfgrass and the urban landscape. Clients are manufacturers, suppliers and applicators of pest control supplies, chemicals and fertilizers, crop scouts and consultants, farmers, nurseryman, Master Gardeners, homeowners, and schools.

Program duration

5 years

Allocated resources

Virginia Tech and Virginia State University

Extension Funding

Year	Federal	State	Local	Other
2000	230,000	22,000	0.0	0.0
2001	212,000	12,000	0.0	0.0
2002	212,000	12,000	0.0	0.0
2003	212,000	12,000	0.0	0.0
2004	212,000	12,000	0.0	0.0

Extension FTE's

Year	Professional			Paraprofessional		
	1862	1890	Other	1862	1890	Other
2000	12.78	0.0	0.0	0.75	0.0	0.0
2001	12.00	0.0	0.0	0.75	0.0	0.0
2002	12.00	0.0	0.0	0.75	0.0	0.0
2003	12.00	0.0	0.0	0.75	0.0	0.0
2004	12.00	0.0	0.0	0.75	0.0	0.0

Pesticide Applicator Training

Statement of issue(s)

Since the early 1970's the safe and proper use of pesticides has been a major environmental, public health, and occupational exposure issue. The issue of risk mitigation associated with occupational use, food safety, water quality, air quality, and casual exposure have driven Congress to apply strict regulatory controls on pesticides and pesticide applicators. As a result, Congress mandated that applicators must be trained to meet certain competency standards in order to use restricted use pesticides. The States followed suit with similar and sometimes more prohibitive regulations. In Virginia, all commercial applicators (those applying pesticides as part of their occupations on the properties of others) are all required to be trained and certified. In addition, there are requirements that agricultural employers be trained so that they can protect and train their farmworkers and pesticide handlers. There is also the desire by non-certified applicators to protect themselves by gaining the knowledge about how to handle pesticides and to make the correct choices when selecting a pest management strategy. Virginia Cooperative Extension (VCE) is the primary pesticide safety educator in the Commonwealth.

The purpose of the Virginia Pesticide Applicator Training Program is to provide a pesticide safety education program to certified and non-certified pesticide applicators in Virginia. USDA and the USEPA have an agreement that Cooperative Extension will take the lead in the States on training applicators to meet the competency standards set by Federal and State laws and regulations for certification and maintenance of a pesticide applicator's license. In Virginia, this mandate is carried out by VCE in cooperation with the state regulatory partner, Virginia Department of Agriculture and Consumer Services. There are over 21,000 certified applicators seeking training through Cooperative Extension and allied training programs throughout Virginia. In most cases, VCE personnel support on-going training as program organizers, speakers, or contributors to associations organizing training around their annual meetings and other activities. A few private companies also sponsor training, but in many cases, training involves VCE speakers. In addition, VCE maintains the training media to support most of the private and commercial certification categories. There are 25 separate categories in which Virginia applicators can be certified. In addition, there are a number of non-certified pesticide workers and handlers seeking pesticide safety training from VCE. These include farmers, farmworkers, homeowners, students, master gardeners, and others. VCE is also involved in the in-service training of federal, state, and local agency personnel located in Virginia. These groups include the EPA, USDA, health care workers, Virginia Departments of Forestry, Transportation, Corrections, local school systems, grounds management employees, county employees, and other cooperators. Funding for training is supported through USDA-CSREES and EPA annual funding and through grants.

Performance goal(s); output/outcome indicators; evaluation framework

Goal 1.: To achieve greater harmony (balance) between agriculture and the environment.

Objective 1.1.: To develop, transfer, and promote the adoption of efficient and sustainable agricultural, forestry, and other resource conservation policies, programs, technologies, and practices that ensure ecosystems achieve a sustainable balance of agricultural activities and bio-diversity.

Performance Goal 1.1.1.: To increase the total number of people completing pesticide safety and risk management programs on an annual basis.

Output Indicator 1.1.1.1.: The total number of people completing a pesticide safety and risk management certification training program.

Output Indicator 1.1.1.2.: The total number of people completing a pesticide safety and risk management re-certification training program.

Fiscal Year	Total Targeted #	Total Actual #	Private Actual #	Commercial Actual #	Technician Actual #
2000					
2001					
2002					
2003					
2004					

Output Indicator 1.1.1.3.: Total Number of Commercial Applicators completing a pesticide safety and risk management certification and/or re-certification program by category.

Fiscal Year	Agricultural Pest Control Plant	Agricultural Pest Control Animal	Forest Pest Control	Ornamental and Turf Pest Control	Seed Treatment	Aquatic Pest Control
2000						
2001						
2002						
2003						
2004						

Fiscal Year	Right-of-Way Pest Control	Industrial, Institutional Pest Control	Public Health Pest Control	Regulatory Pest Control	Demonstration & Research Pest Control	Other Pest Control (Specify) ----- —
2000						
2001						
2002						
2003						
2004						

Output Indicator 1.1.1.4.: The total number of people completing an education program (non-certification or non-recertification) in pesticide safety and risk management for selected groups.

Fiscal Year	Total		Consultants		Technicians		Government Officials & Administrators	
	Targeted #	Actual #	Targeted #	Actual #	Targeted #	Actual #	Targeted #	Actual #
2000								
2001								
2002								
2003								
2004								

Output Indicator 1.1.1.4. - Continued -

Fiscal Year	Pesticide Handlers (WPS)*		Farm Workers (WPS)*		Master Gardener		Food & Nutrition (EFNEP)** Staff	
	Targeted #	Actual #	Targeted #	Actual #	Targeted #	Actual #	Targeted #	Actual #
2000								
2001								
2002								
2003								
2004								

* Worker Protection Standard

** Expanded Foods Nutrition Education Program

Output Indicator 1.1.1.4. - Continued -

Fiscal Year	Educators		Health Care Professionals		Dealers		Other (List)	
	Targeted #	Actual #	Targeted #	Actual #	Targeted #	Actual #	Targeted #	Actual #
2000								
2001								
2002								
2003								
2004								

Performance Goal 1.1.2.: To increase the total number of people completing a pesticide safety and risk management program who plan to adopt one or more recommended pesticide use practices within the next year.

Outcome Indicator 1.1.2.1.: The total number of people completing a pesticide safety and risk management certification or re-certification training program on an annual basis who plan to adopt one or more recommended pesticide use practices within the next year.

Fiscal Year	Total Targeted #	Total Actual #	Total # Who Actually Plan to Adopt Safeguards for Health	Total # Who Actually Plan to Adopt Safeguards for Environment	Total # Who Actually Plan to Adopt Other Recommended Practices
2000					
2001					
2002					
2003					
2004					

Outcome Indicator 1.1.2.2.: The total number of people completing a pesticide safety and risk management educational program who plan to adopt one or more recommended pesticide use practices within the next year.

Fiscal Year	Total Targeted #	Total Actual #	Total # Who Actually Plan to Adopt Safeguards for Health	Total # Who Actually Plan to Adopt Safeguards for Environment	Total # Who Actually Plan to Adopt Other Recommended Practices
2000					
2001					
2002					
2003					
2004					

Performance Goal 1.1.3.: To increase the total number of people completing a pesticide safety and risk management program who actually adopted one or more recommended pesticide use practices.

Outcome Indicator 1.1.3.1.: The total number of people completing a pesticide safety and risk management certification or re-certification training program who actually adopted one or more recommended pesticide use practices since certification or re-certification.

Fiscal Year	Total Targeted #	Total Actual #	Total # Who Actually Plan to Adopt Safeguards for Health	Total # Who Actually Plan to Adopt Safeguards for Environment	Total # Who Actually Plan to Adopt Other Recommended Practices
2000					
2001					
2002					
2003					
2004					

Outcome Indicator 1.1.3.2.: The total number of people completing a pesticide safety and risk management educational program who actually adopted one or more recommended pesticide use practices since completing their last educational program.

Fiscal Year	Total Targeted #	Total Actual #	Total # Who Actually Plan to Adopt Safeguards for Health	Total # Who Actually Plan to Adopt Safeguards for Environment	Total # Who Actually Plan to Adopt Other Recommended Practices
2000					
2001					
2002					

2003					
2004					

Performance Goal 1.1.4.: To increase the total number of people completing in-service training or train-the- trainer programs on pesticide safety and risk management practices on an annual basis.

Output Indicator 1.1.4.1.: The total number of people completing an in-service training or train-the- trainer program in pesticide safety and risk management practices.

Fiscal Year	Total		University Personnel		Private		Government Personnel	
	Targeted #	Actual #	Targeted #	Actual #	Targeted #	Actual #	Targeted #	Actual #
2000								
2001								
2002								
2003								
2004								

Objective 1.2.: To improve decision-making on public policies (and programs) affecting the relationship between agricultural practices, human health, and the environment.

Performance Goal 1.2.1.: To increase the number of new and updated training and educational materials on an annual basis to support extension training and educational programs on pesticide safety and risk management.

Output Indicator 1.2.1.1.: The total number of printed materials newly developed or revised/updated to support extension training and educational programs on pesticide safety and risk management.

Fiscal Year	Manuals	Bulletins, Brochures, and Fact Sheets	Newsletters	Published Articles

	Newly Developed #	Revised/ Updated #	Newly Developed #	Revised/ Updated #	Newly Developed #	Newly Developed #	Revised/ Updated#
2000							
2001							
2002							
2003							
2004							

Output Indicator 1.2.1.2.: The total number of electronic media and computer software newly developed or revised/updated to support extension training and educational programs in pesticide safety and risk management.

Fiscal Year	Video Tapes		Slides/Power Point Presentations		Mass Media	Computer Aided Instruction & Educational Software	
	Newly Developed #	Revised/ Updated #	Newly Developed #	Revised/ Updated #	Newly Developed #	Newly Developed #	Revised/ Updated#
2000							
2001							
2002							
2003							
2004							

Performance Goal 1.2.2.: To increase on an annual basis the impact of state extension PAT and pesticide coordinators at land grant universities and colleges (SLGUC) for public policy making and decisions on pesticide training and education in selected venues and among identified and/or under served groups.

Output Indicator 1.2.2.1.: The total number of committees state PAT or pesticide coordinators serve on to provide information and expert advice on pesticide training and education programs and materials in selected venues and among identified and/or under served groups.

Fiscal Year	Total Targeted #	Total Actual #	1862 SLGUC * Committees Actual #	1890 SLGUC* Committees Actual #	County Committees Actual #	State Exec./Legis. Committees Actual #	Federal Exec./Legis. Committees Actual #
2000							
2001							
2002							
2003							
2004							

Continued -

Fiscal Year	Native American Committees Actual #	Professional Associations Committees Actual #	Pesticide/ Chemical Industry Actual #	Commodity Groups & Committees Actual #	Minority & Underserved Groups Actual #	Other Groups & Committees Actual #
2000						
2001						
2002						
2003						
2004						

* SLGUC denotes State Land Grant Universities and Colleges

Key program component(s)

1. Provide training for certified pesticide applicators as appropriate and economically possible statewide.
2. Provide a resource on pesticide safety education and information to the public and VCE agents and specialists through web-based information databases and training available through VCE, Virginia Tech Pesticide Programs, and allied cooperators and associations.
3. Coordinate training services available through VCE statewide by supporting agents and specialists (trainers) with resources and in-service training.
4. Maintain an outreach presence and consulting service to the public through Virginia Tech Pesticide Programs and appropriate VCE Units and Departments.

Internal and external linkages

Internal linkages involve collaborative work with Extension agents, specialists, and researchers statewide including the outlying agricultural research and extension centers, local Extension units, and campus-based faculty.

External linkages involve commodity specific organizations and government agencies, agricultural organizations, state and federal agricultural and environmental agencies, and other related groups.

Target audiences

Target audiences include certified private and commercial pesticide applicators, non-certified applicators, pesticide safety educators, students, health-workers, environmentalists, and

pesticide regulators. In addition, customers include all stakeholders including public and private organizations, groups, institutions, agencies, and individuals.

Program duration

This is an on-going program, which extends beyond five years.

Allocated resources

Extension Funding

Year	Federal	State	Local	Other
2000	42,000	42,000	42,000	0.0
2001	42,000	42,000	42,000	0.0
2002	42,000	42,000	42,000	0.0
2003	42,000	42,000	42,000	0.0
2004	42,000	42,000	42,000	0.0

Extension FTE's

Year	Professional			Paraprofessional		
	1862	1890	Other	1862	1890	Other
2000	3.0	0.0	0.0	1.0	0.0	0.0
2001	3.0	0.0	0.0	1.0	0.0	0.0
2002	3.0	0.0	0.0	1.0	0.0	0.0
2003	3.0	0.0	0.0	1.0	0.0	0.0
2004	3.0	0.0	0.0	1.0	0.0	0.0

Pesticide Impact Assessment

Statement of issue(s)

The purpose of the Virginia Pesticide Impact Assessment Program is to provide science-based information to promote informed decisions on registered pesticides. Since the increased regulation of pesticides in the 1970's, there has been a need to assess the impact of these regulatory decisions on our ability to control pests. Proper decision-making is even more critical today with the implementation of the Food Quality Protection Act (FQPA). The FQPA potentially impacts every currently viable pest management strategy, including non-chemical alternatives, due to its potential effects on IPM practices. All agricultural producers and specialty applications could be impacted by this process, without proper decision-making and input from stakeholders on the importance of these pest management strategies. The National Agricultural Pesticide Impact Assessment Program (NAPIAP) and the USDA Office of Pest Management Policy (OPMP) are working with the US Environmental Protection Agency to make sure this decision-making process does not negatively impact agricultural production and related businesses in the U.S. The Virginia Pesticide Impact Assessment Program is part of the NAPIAP and OPMP programs. Our efforts are accomplished with two objectives:

Objective 1.0: To improve the level of knowledge, awareness, and understanding about pesticides, pesticide use and usage, and pest management practices among government officials and staff that contribute to improved regulatory decisions.

Objective 2.0: To promote informed decisions on pesticide usage and other pest management strategies(tactics and practices) through collaborative multi-party partnerships.

Performance goal(s); output/outcome indicators; evaluation framework

Performance Goal 1.1: To annually improve the base of crop profile and pesticide use data available to decision-makers in USDA, USEPA, state departments of agriculture, state regulatory agencies, and Congressional staff to address public policy issues related to pesticides, pesticide use and usage, and pest management practices.

Indicator 1.1.1a: Total number of crop profiles initiated per year.

Indicator 1.1.1b: Total number of crop profiles completed and published per year.

Indicator 1.1.1c: Total number of crop profiles updated/revised per year.

Indicator 1.1.2a: Total number of new pesticide use and/or pest management surveys to be initiated within the next two years.

Indicator 1.1.2b: Total number of new pesticide use and/or pest management surveys to be entered into a retrievable database.

Performance Goal 1.2: To increase the scope and quality of participation by citizens, government officials, agricultural producers, and other constituencies in public policy decisions affecting regulation and utilization of pesticides.

Indicator 1.2.1: Total number of events in which data on pesticides, pesticide use and usage, and/or pest management practices is presented and/or shared with citizens, constituency groups, elected representatives, or other government officials.

Indicator 1.2.2: Total number of participants attending presentations in which data is provided and/or discussed on pesticides, pesticide use and usage, and/or pest management practices during the reporting year.

Indicator 1.2.3: Total number of occasions when stakeholders and constituencies are provided information and expert advice on pesticide uses, pesticide usage, and/or pest management strategies.

Indicator 1.2.4: Total number of occasions when feedback on pesticide usage and pest management strategies was obtained from stakeholders.

Indicator 1.2.5: Total number of responses made to information requests concerning pesticide use and usage and/or pest management practices.

Indicator 1.2.6a: Total number of staff hours allocated to developing, maintaining, updating, and/or promoting web sites containing NAPIAP information.

Indicator 1.2.6b: Total number of contacts (hits) at web sites containing NAPIAP information.

Indicator 1.2.7a: Total number of newly developed and/or revised/updated printed materials published per year containing NAPIAP information.

Indicator 1.2.7b: Total number of articles published in journals, periodical publications, newsletters, and/or magazines per year containing NAPIAP information.

Indicator 1.2.8a: Total number of newly developed and/or revised electronic media published per year containing NAPIAP information.

Indicator 1.2.8b: Total number of mass media articles (new releases, radio spots, television spots, or newspaper articles) published per year that contain NAPIAP information.

Performance Goal 2.1: To increase the number of multi-party collaborations, partnerships, and communications that will promote more informed decision-making on pesticide usage and other pest management strategies, tactics, and/or practices.

Indicator 2.1.1: Total number of decisions on pesticide usage and/or pest management strategies involving multi-party partnerships and collaborations.

Indicator 2.1.2: Total number of inter-state, multi-party partnerships and collaboration that support decisions on pesticide usage and pest management strategies.

Indicator 2.1.3: Total number of intra-state, multi-party partnerships and collaboration that support decisions on pesticide usage and pest management strategies.

Key program component(s)

5. Compilation and publication of crop profiles for Virginia's economically important crops
6. Maintaining an Extension pesticide information program and a pest management needs assessment program.
7. Maintenance and continued development of a Virginia pesticide impact assessment web site and pesticide use/information databases.

Internal and external linkages

Internal linkages involve collaborative work with Extension agents, specialists, and researchers statewide including the outlying agricultural research and extension centers, local Extension units, and campus-based faculty.

External linkages involve commodity specific organizations and government agencies, agricultural organizations, state and federal agricultural and environmental agencies, and other related groups.

Target audiences

Target audiences include government decision-makers at the state and federal levels. In addition, customers include all stakeholders including public and private agricultural organizations, groups, and agencies.

Program duration

This is an on-going program, which extends beyond five years.

Allocated resources

Extension Funding

Year	Federal	State	Local	Other
2000	34,171	35,000	0.0	0.0
2001	34,171	35,000	0.0	0.0
2002	34,171	35,000	0.0	0.0
2003	34,171	35,000	0.0	0.0
2004	34,171	35,000	0.0	0.0

Extension FTE's

Year	Professional			Paraprofessional		
	1862	1890	Other	1862	1890	Other
2000	1.0	0.0	0.0	1.0	0.0	0.0
2001	1.0	0.0	0.0	1.0	0.0	0.0
2002	1.0	0.0	0.0	1.0	0.0	0.0
2003	1.0	0.0	0.0	1.0	0.0	0.0
2004	1.0	0.0	0.0	1.0	0.0	0.0

RREA

Statement of issue(s)

Virginia is a heavily forested state. With over 15.4 million acres of commercial forestland, the Commonwealth's citizens expect their forests to be sustainably managed, healthy, and capable of providing a wide variety of economic and environmental benefits. Some 400,000 individuals (77%), the majority of which do not have up-to-date management plans, own most of Virginia's forests. Virginia's forests also provide the raw material for a large and varied forest products industry that annually produces over \$3 billion worth of goods. One of every six Virginians working in manufacturing is employed by the forest products industry. Additionally, Virginia's forests support a great diversity of wildlife and protect the headwaters of major stream and river systems. Fish and wildlife is important for its environmental benefits, but also supports a large recreational industry. Approximately 1.2 million Virginians enjoy sport fishing and annually spend \$492 million on their sport. About 487,000 Virginians are hunters, and they annually spend an additional \$228 million. Through license fees, hunters and fishermen provide the revenue to manage the state's fish and wildlife resources.

There are many educational needs associated with the management of Virginia's forests and fish and wildlife resources, as well as the industries that depend on them. Forest landowners need both educational service and technical assistance to plan management activities that will meet both economic and environmental objectives. Landowners need educational opportunities so that they can take a more active role in managing their lands – planning for and undertaking reforestation, improving existing woodlots, establishing forested buffers along streams, improving fish and wildlife habitat, investing their money wisely and figuring their tax liabilities, and using recommended best management practices when harvesting and conducting other site disturbing activities.

The forest industry, likewise, requires continuous educational opportunities to ensure its financial success. Timber harvesters require training to operate safely, efficiently, and with minimal environmental damage. New and existing companies that produce primary or secondary forest products, likewise, need training opportunities to open new markets; improve manufacturing processes; meet health, safety, and/or environmental regulations; and become more efficient.

Performance goal(s); output/outcome indicators; evaluation framework

Performance Goals:

Objective 1

To produce new and value-added agricultural products and commodities.

Performance Goal 1

To annually increase forest, range and wood products producer awareness, understanding, and information regarding the production of new and value-added commodities and products in which CSREES partners and cooperators play an active extension role.

Objective 2

To increase the productive efficiency of the US forest, range, and wood products production system.

Performance Goal 1

To annually increase agricultural producer awareness understanding, and information on improving the productivity and global competitiveness of the US forest, range, and wood products system in which CSREES partners and cooperators play an active education role.

Objective 3

To develop, transfer, and promote the adoption of efficient and sustainable, forestry, and other resource conservation policies, programs, technologies, and practices that ensure ecosystem integrity and biodiversity.

Performance Goal 1

To annually increase natural resource owners and managers' awareness, understanding, and information regarding the adoption practices that sustain and/or protect ecosystem integrity and biodiversity in which CSREES partners and cooperators play an active extension role.

Objective 4

To develop, transfer, and promote adoption of efficient and sustainable forestry, and other resource policies, programs, technologies, and practices that protect, sustain, and enhance water, soil and air resources.

Performance Goal 1

To annually increase producer adoption of natural resource management that conserve and/or protect surface and ground water supplies.

Objective 5

To enhance economic opportunities and the quality of life among families and communities through natural resource enterprises.

Performance Goal 1

To annually increase economic opportunities in communities through natural resource economic development programs in which CSREES partners and cooperators play an active extension role.

Output/Outcome Indicators:

Objective 1

Performance Goal 1

Indicator 1

The total number of persons completing nonformal education programs on new and value-added forest, range and wood commodities and products.

Year	Number of Persons Completing Programs	
	Target	Actual
2000	1050	
2001	1100	
2002	1150	
2003	1200	
2004	1250	

Objective 2

Performance Goal 2

Indicator 1

The total number of persons completing nonformal education programs to improve the productivity and global competitiveness of the US forest, range, and wood products system.

Year	Number of Persons Completing Programs	

	Target	Actual
2000	550	
2001	600	
2002	650	
2003	1200	
2004	1250	

Objective 3

Performance Goal 1

Indicator 1

The total number of persons completing nonformal education programs on sustaining and protecting ecosystem integrity and biodiversity while improving the productivity of the US natural resource lands.

Year	Number of Persons Completing Programs	
	Target	Actual
2000	3150	
2001	3300	
2002	3450	
2003	3600	
2004	3750	

Objective 4

Performance Goal 1

Indicator 1

The total number of persons completing nonformal education programs on sustaining and/or protecting the quantity and quality of surface water and ground water supplies on natural resource lands.

Year	Number of Persons Completing Programs	
	Target	Actual
2000	1050	
2001	1100	
2002	1150	
2003	1200	
2004	1250	

Objective 5
Performance Goal 1
Indicator 1

The number of existing natural resource-based businesses maintaining or expanding operations resulting from economic development programs developed in collaboration with CSREES partners and cooperators.

Year	Number of Existing, Maintaining or Expanding	
	Target	Actual
2000	55	
2001	60	
2002	65	
2003	70	
2004	75	

Evaluation Framework:

All educational programs offered by Virginia Cooperative Extension (VCE) are evaluated via post-program, written surveys. Additionally, on a selected basis, programs are evaluated for impacts over the long-term (3 to 5 years). During 1999 the Logger Education Program has been selected for evaluation, and in 2000 the Landowner Education Program will be similarly evaluated. These longer-term evaluations require considerable effort and investment, therefore, it is infeasible to conduct audience-wide, long-term surveys of all programs each year. The more in depth, longer-term surveys will rely on mailed questionnaires followed by data analysis, interpretation, and reporting.

Key program component(s)

VCE and the College of Forestry and Wildlife Resources at Virginia Tech plan to meet educational needs through a host of activities. Forest landowner education programs involve tours, seminars, workshops, and shortcourses. In 1998, a Forest Landowner Education Work Group was formed in Virginia, with major support from VCE. Four VCE staff serve on the Work Group which coordinates, promotes, improves, and evaluates forest landowner education programs statewide. VCE specialists provide technical expertise and support to the Work Group. Additional innovative programs such as COVERTS and LEAP are active in Virginia.

Forest industry programs utilize traditional workshops and training sessions, and also direct technical assistance for smaller companies that do not have large corporate resources, i.e. small sawmills and pallet manufacturers. Across all program areas, specialists prepare and distribute educational materials such as Extension bulletins, trade magazine articles, newsletters, videotapes, slide sets, etc. These materials will continue to be developed and upgraded as needed.

Internal and external linkages

VCE specialists in the College of Forestry and Wildlife Resources partner frequently with specialists in other departments at the University, as well as a large number of external agencies, organizations, and companies. Sometimes these linkages are strictly programmatic, other times substantial financial support is involved. For example, the US Forest Service provides support for continuing education programs, the Ruffed Grouse Society supports the COVERTS program, Virginia's Sustainable Forestry Initiative and the Virginia Forestry Association support both logger and landowner educational programs. Most educational programs conducted by VCE involve other partners, the major supporters include the Virginia Department of Forestry, the Virginia Department of Game and Inland Fisheries, the US Forest Service, the Virginia Forestry Association, the Virginia Forest Products Association, and forest industry.

Target audiences

VCE specialists have identified a host of target audiences to meet the educational needs identified in this plan. Primary audiences include forest landowners and the natural resource professionals who provide assistance to those landowners; loggers and woodworkers; forest industry workers, production supervisors, and marketing specialists; and youth. These audiences will be reached via the educational programs described above. A concerted effort is now underway to develop a more lasting relationship with some audiences. For example, through the COVERTS program, forest landowners receive an intensive educational experience, then are routinely contacted and encouraged to serve as innovators and pass their knowledge on to other landowners.

The new Forest Landowner Education Work Group is focused on reaching new audiences that have not previously been served by educational or technical assistance programs. For example, in 1997 and 1998 VCE compiled lists of forest landowners from tax rolls in selected counties around the state. These landowners received mailings of meeting announcements and educational materials. This practice will be continued in 1999 and beyond.

Program duration

All educational programs described in this plan are considered long-term (5 years or longer).

Allocated resources

Extension Funding

Year	Federal	State	Local	Other
2000	88,000	785,000	0.0	300,000
2001	88,000	785,000	0.0	300,000
2002	88,000	785,000	0.0	300,000
2003	88,000	785,000	0.0	300,000
2004	88,000	785,000	0.0	300,000

Extension FTE's

Year	Professional			Paraprofessional		
	1862	1890	Other	1862	1890	Other
2000	10.35	0.0	0.0	3.58	0.0	0.0
2001	11.35	0.0	0.0	3.58	0.0	0.0
2002	11.35	0.0	0.0	3.58	0.0	0.0
2003	11.35	0.0	0.0	3.58	0.0	0.0
2004	11.35	0.0	0.0	3.58	0.0	0.0

Sustainable Agriculture

Statement of issue(s)

Sustainable agriculture encompasses environmental, economic, and social consequences of agricultural activities. Agricultural extension agents and other agricultural professionals have received little systematic training in the concepts and techniques associated with sustainable agriculture, and are not prepared to respond to clients' questions concerning these dimensions of farming systems. Training in both the conceptual and technical dimensions of sustainable agriculture will better prepare extension agents to give information and guidance.

Performance goal(s); output/outcome indicators; evaluation framework

To annually increase agricultural Extension Agent and associated professional awareness, understanding, and information regarding the adoption of agricultural production practices that sustain and/or protect ecosystem integrity and biodiversity.

Indicator: The number of Extension Agents and Professionals completing educational programs on sustainable agriculture.

Key program component(s)

Key components of the training will be delivery of workshops and other educational opportunities to agents and other professionals concerning selected elements of sustainable agriculture philosophy and practices. These include such topics as nutrient management, integrated pest management, grazing management, and soil quality. Conceptual training will be sought through participation in regional workshops. Materials will be developed as needed or obtained from other state or regional programs.

Internal and external linkages

Research personnel from agronomy, animal science and social science departments at state and regional universities will be enlisted as trainers for educational programs. Trainers will also be enlisted from farmer-stakeholder clients as peer-to-peer trainers.

Target audiences

1. Farmers with expertise in sustainable agriculture who can serve as trainers.
2. Extension agents and other persons with agricultural education responsibilities.

Program duration

2000-2004

Allocated resources

Extension Funding

Year	Federal	State	Local	Other
2000	10,000	0.0	0.0	0.0
2001	10,000	0.0	0.0	0.0
2002	10,000	0.0	0.0	0.0
2003	10,000	0.0	0.0	0.0
2004	10,000	0.0	0.0	0.0

Extension FTE's

Year	Professional			Paraprofessional		
	1862	1890	Other	1862	1890	Other
2000	5.2	2.1	0.0	0.0	0.0	0.0
2001	5.2	2.1	0.0	0.0	0.0	0.0
2002	5.2	2.1	0.0	0.0	0.0	0.0
2003	5.2	2.1	0.0	0.0	0.0	0.0
2004	5.2	2.1	0.0	0.0	0.0	0.0

Water Quality

Statement of issue(s)

Significant progress has been made during the past decade in efforts to manage pollution from both point and non-point sources in both urban and rural areas alike. The Chesapeake Bay watershed includes approximately two-thirds of the land area in Virginia. A joint EPA-State-Local Chesapeake Bay improvement and protection effort has resulted in significant progress in recent years in both rural and urban areas. Other programs such as TVA in Southwest Virginia and joint programs with North Carolina in Southside and Southeastern Virginia have seen successful in water quality improvements. Programs such as Farm*A*Syst and Home*A*Syst are integral parts of the Extension educational effort. However, the quality of Virginia's waters continue to be threatened by both point and non-point sources of pollution in all parts of the state.

Community Sustainability

Community sustainability involving both small and large communities has become a primary educational issue. The program ties community economic and growth/development activities to protection and/or improvement in water quality and water quantity. Efforts are devoted to community site planning, growth and development management, waste disposal and social impacts.

Individuals, groups, and local government officials need understanding of capacity to use water resource information on water: as a public good; land use; resource characterization; mandated regulations; financing; development of local management capacity, tools to prevent direct contamination of groundwater; and tools to prevent movement of all pollutants into both surface and ground waters. A major effort in the future will be management of population and economic growth in a manner to protect water quality.

Nutrients

Nutrients continue to be an important issue. Excess transport of nitrogen and phosphorus into surface water may result in eutrophication, nutrient enrichment, which impedes light penetration and depletes oxygen required by aquatic life. Groundwater contamination poses a potential health threat to humans and livestock that depend upon groundwater as a water source.

Cropping patterns have the potential to provide nutrient runoff and we must continue to devote attention to this issue. Animal waste management has become an especially important issue. Therefore, nutrients derived from animal wastes, as well as other fertilizer sources, are receiving considerable attention. Dairy farms tend to be reasonably sustainable farming systems relative

to cropping programs, but problems often arise because of muddy conditions near barns and farmsteads, over-application of wastes near animal housing areas, concentrated animal stream crossings, and overgrazing of pastures and outdoor resting areas. Swine and poultry operations often are large and do not include sufficient cropland to allow manure application at crop utilization rates. All of these conditions contribute nutrients to the Chesapeake Bay and other watershed systems.

For animal wastes, programs are being put in place that encourage development and implementation of nutrient management plans which first consider utilization of livestock and poultry wastes. Additional emphasis was placed on animal wastes management during the last two sessions of the Virginia General Assembly where legislation was passed that will regulate much of the swine and poultry industry. Where sufficient crop and pastureland are not available, sale and transfer of manure to other farmers for use as fertilizer or animal feed is encouraged. A statewide manure testing program allows farmers to determine the amount of nutrients available from the livestock or poultry manure, so that realistic nutrient management recommendations and plans can be developed by either Extension Agents or advisory personnel from the Virginia Division of Soil and Water Conservation.

Urban lawns are a significant contributor to nutrient runoff. This is of particular concern in the Chesapeake Bay watershed due to rapid urbanization and growth. One successful program for urban nutrient management is the Water-wise Gardener program currently being implemented at the local Extension unit level in over 10 urban Virginia counties. The program is considered to be the model educational program for control of nutrients from home lawns in Virginia.

Control of nitrogen and phosphorus in both rural and urban areas has been a major component of the Chesapeake Bay Program. An important goal is a 40 percent reduction of the controllable loads of nitrogen and phosphorus entering the Bay between 1985 and the year 2000. A reevaluation is in progress to extend the cap or additional reductions into the next century. Progress toward the reduction goals for nitrogen and phosphorus is measured in pounds per year. Between 1985 and 1996 phosphorus loads delivered to the Bay from all tributaries declined six million pounds per year. During that period, nitrogen loads declined 29 million pounds per year. Virginia's loads declined proportionately. With some management strategies in place, it is anticipated that the goal will be met by year 2000. Extension has and will continue to provide much of the education for both rural and urban areas to meet the goal and then to maintain a cap after year 2000. These measurements are gross numbers for the Bay as a whole. Measurement of impact of VCE activities at this level is inappropriate. VCE must rely on less quantitative measurements. While application of conservation measures is a generally used measure of effectiveness at the small-scale level, VCE will provide effort to measure results in terms of water quality changes for all scales of effort. Some quantification of

nutrient use and recommended practice adoption by homeowners is available from Water-wise Gardener records. Results indicate that on average, after educational program participation, homeowners reduce their nutrient applications per 1000 square foot by 1-2 pounds of actual nitrogen.

Pesticides

Proper use of pesticides continues to be an important water quality issue. Pesticides are used on over 90% of Virginia's corn, soybean, and peanut acreage, and on large portions of the acreage of other agronomic and horticultural crops. Substantial public concern exists relative to the potential deleterious effects of agricultural pesticides on groundwater quality. Although most research indicates that pesticide introduction to groundwater originates in point sources, some introduction from standard agricultural applications also occurs. Virginia growers need information on pesticide efficacy, cost, leachability, and environmental fate such that they can maintain economic levels of crop protection while minimizing the potential for contamination of groundwater. Attention must also be given to use of pesticides on home lawns, commercial areas and golf courses. An objective of the Chesapeake Bay program includes efforts to have, by the year 2000, voluntary integrated pest management practices on 50 percent of the commercial land and 25 percent of the residential land within the Bay basin. Programs are in place to provide educational efforts to meet these goals. These measures are gross for the entire Bay. Measurement of impact of VCE activities is inappropriate at this level. VCE evaluation will be done with use of more traditional measures.

Water Supply

Extension continues to help improve individual and community water systems. The water requirements of the vast majority of rural homes throughout Virginia are met by individual water supply and distribution systems. The domestic water needs of approximately 1.5 million Virginians are met by private wells and springs. Rural residents are often confronted with water shortages, poor water quality conditions, inadequate delivery systems, escalating costs of operation, and maintenance deficiencies. Residents need to be made aware of water quality problems, some of which are health hazards, and methods to correct these deficiencies. Water quality and related problems are often misdiagnosed or overlooked, due to a lack of complete information, often leading to a worsening of future conditions. Homeowners and system managers need to know what steps to take to prevent further degradation of their own water supply.

Other Issues

Programs are in place to implement riparian forest buffers, to control toxic materials, to restore habitat, and to manage air depositions.

Performance goal(s); output/outcome indicators; evaluation framework

Nutrients:

Extension is working with farmers to encourage adoption of nutrient management practices through: subsidized manure testing (funding from the Virginia Department of Conservation and Recreation); nutrient management planning, including soil nitrate testing and cover cropping/residue management; demonstrations and field days; workshops and conferences; and dissemination of publications. Also, regional conferences will be held to educate producers about the importance of efficient management of N and P. The impact of coliform bacteria on water quality from poorly managed livestock manure will also be addressed. Later, workshops will be held to familiarize producers with the various approaches that are available to more efficiently utilize and manage crop nutrients and livestock waste, including development of nutrient management plans. Field days and demonstrations will be planned to show practical use of the management tools. Technical publications, videotapes, and newsletters will further supplement the training. The education programs, including demonstration lawns, will continue for urban areas.

By Year 2004: Objective is to ensure that 100% commercial farmers have information to facilitate the adoption of best management practices for protection of water resources.

Work with Soil and Water Conservation Districts to manage nutrients.

Goal is to work with all 46 districts each year.

Work with local “working groups” to plan programs to manage nutrients.

Goal is to work with at least 10 groups per year.

Number of farmers to whom information provided.

Goal is to provide education to 300 in animal waste per year.

Goal is to provide education to 2,250 in nutrient management each year.

Nutrient management plans implemented.

Increase number by 10% each year.

Number of dairy loafing lot rotation systems installed.

Increase number by 10% each year.

Number paddocks, travel lanes and stream crossings installed.

Increase number by 10% each year.

Number of acres on which BMPs applied.

Have irrigation BMPs on 10,000 acres each year.

Have animal waste BMPs on 20,000 acres each year.

Have nutrient management BMPs on 500,000 each year.

Number soil samples evaluated.

Increase number by 10% each year.

Number tissue nitrate samples evaluated.

Increase number by 10% each year.

Number animal waste storage systems installed.

Increase number by 10% each year.

Number of areas receiving bio-solids nutrient balancing.

Have bio-solid nutrient balance on 30,000 acres each year.

By Year 2004: Objective is to increase by 100% the number of residential households practicing urban nutrient management. A computerized system to track residential urban nutrient management will be designed and installed statewide so that each unit office can track its efforts towards this objective.

Number new participants in urban nutrient management program.

Increase number by 10% each year.

Number new residential lawn added to the demonstration lawn program.

Add 100 new lawns each year.

Square footage of residential and public land turf under urban nutrient management

Increase by 10% each year

Accounting of nutrient reduction practices being followed by participants

Detail practices and nitrogen reduction potential

Measure changes in amount of fertilizer getting into waterways.

Increase by 10% pounds of nitrogen prevented each year.

Increase by 10% pounds of phosphorus prevented each year.

Pesticides:

From the pesticide perspective, the program will use area IPM specialists and pest control specialists to deliver meetings and training sessions to agents and growers to facilitate IPM farm plan development. Area IPM specialists and agents will then interact directly with growers via meetings, publications, and one-on-one contact to develop the actual farm plans. IPM education is an integral part of the urban residential programs. Educational resources include: Pest Management Guide publication; IPM farm plan materials including pesticide leachability ratings, and area IPM specialists.

The VCE Pest Management Guide forms the basis for pesticide recommendations within approved conservation compliance plans. Priority practices for pesticide management include:

By Year 2004: Objective is to ensure that 100% of commercial applicators have adequate information to properly management use and disposal of pesticides.

Number of persons receiving applicator training.

Provide training to 2,500 each year.

Number community-based water systems receiving training.

Provide training to 6 each year.

Number acres with pesticide BMPs applied.

Have pesticide BMPs on 500,000 acres each year.

Change in use of pesticides.

Increase changes in practices by 10% each year.

Number persons receiving training on pesticide mixing procedures.

Increase number by 10% each year.

Number mixing facilities installed.

Increase number by 10% each year.

Number receiving training on use and disposal of toxic household chemicals safely.

Increase number by 10% each year.

Water Supply:

For the water supply protection program, Extension is attempting to improve adoption of management practices by increasing household residents' awareness of water quality problems and protection strategies, primarily through the understanding of their own water supply and quality situation. Therefore a major part of this educational effort involves water test results and subsequent interpretation of those results. VCE will continue to facilitate the conduct of water well testing programs by other organizations as well as investigate opportunities to directly sponsor and manage such programs. Furthermore, individual well water users will be advised to obtain water quality analyses of their own supplies in addressing their questions about diagnostic symptoms, for example, as well as encouraged to establish a routine pattern of water testing.

To address the household-well-water perspective, a water testing/ diagnostic procedure will be offered to household residents relying on private/individual water supplies in participating units. The program is launched by one or more public meetings in which various topics (such as local hydrogeology, likely sources of contamination, current information on local water quality, health significance of home water supplies, and basic water sampling procedures) are discussed. Attendees can sign up to participate and, as a result, obtain a water quality analysis of their own household water. Nuisance concerns such as iron and hardness, and health-related contaminants such as nitrate, bacteria, and selected pesticides are tested for under prior arrangements with private water testing labs and/or labs at Virginia Tech. Follow-up

"interpretation" meetings are then held after testing has been completed. At these meetings, in addition to discussing test results, management practices to eliminate, reduce, or prevent water contamination, including such measures as well improvements, water treatment, etc., are covered.

For urban wellhead protection, Northern Virginia, Richmond, and Norfolk/Virginia Beach had urban type problems that often lacked appropriate policies. The Northern Piedmont, Shenandoah Valley, and Southwest Virginia geographic areas have pesticide and nutrient related water degradation problems that have been improved with effective public policy practices. All geographic areas and political subdivisions have developed public policy for groundwater protection, wellhead protection programs and on-site sewage systems.

By Year 2004: Objective is to ensure that 100% of the community-based water systems have information to facilitate the adoption of best management practices for protection of water supplies. Increase by two counties each year the number receiving domestic water testing and prevention programs.

- Number of community-based water systems to which information provided.

 - Provide education to 30 systems each year.

- Number counties with water system testing programs.

 - Provide testing program for 4 additional counties each year.

- Number plans developed for source protection.

 - Increase number by 10% each year.

- Number of residential water quality demonstrations for nutrients, pesticides/IPM, and on-site systems.

 - Provide 10 demonstrations each year.

- Number of counties with program for proper maintenance of septic systems.

 - Establish program in 4 counties each year.

Community Sustainability:

For the community sustainability issue VCE has partnered with the Land, Growth, Stewardship Subcommittee, the Center for Chesapeake Communities and the Virginia Chesapeake Bay Local Assistance Department to provide information on growth management and sustainability within communities as a priority means to protect water quality. VCE has conducted workshops, organized information meetings and has established a site demonstration project to demonstrate proper location of structures for water quality protection and population settlement patterns as ways to protect the environment.

By Year 2004: Objective is to increase by 100% the number of communities and elected/appointed officials who receive information of community-based water quality issues.

Number of communities and officials who participate in community-based water quality education programs.

Increase number by 10% each year.

Number demonstration sites installed for growth management practices to protect water quality.

Add one demonstration site each year.

Number officials receiving information on market-based strategies.

Increase number by 10% each year.

Number of communities receiving education at local level on options and alternative solutions to protect water quality.

Increase number by 10% each year.

Number of homeowners and communities using proper maintenance of septic systems.

Increase number by 10% each year.

Number of communities using incentives to protect water quality.

Increase number by 10% each year.

Work with state agencies to develop and implement policies and strategies.

Work with at least 5 agencies each year.

Bio-solids:

Management of bio-solids has been receiving increased attention. An objective of the education program is to ensure proper bio-solids management.

Number of acres of proper management of bio-solids.

Goal is 30,000 acres each year.

Evaluation and Linkages:

A 25-member University-wide environment/water quality committee meets regularly to develop and implement the overall campus-based and field-based program. The program's overall goal is: to provide appropriate policy education and program development/implementation to allow government officials and individuals to decide on appropriate level of environmental quality.

The operational program is based on five primary objectives: management of nutrients and agricultural-employed wastes, agricultural chemicals and toxics management, urban/residential water quality management, public policy and local water quality/environmental management and 4-H and other youth water quality education.

Each specialist and each agent buys time and effort annually in the appropriate objective. Likewise, each specialist and each agent reports annually on accomplishments.

Virginia Tech has a non-point source coordinator located within the Virginia Department of Conservation and Recreation (DCR), the state's non-point source management agency. Consequently, performance monitoring is closely coordinated with the water quality monitoring program across the state. Also, DCR and VA Tech jointly monitor writing of nutrient management plans and implementation of these plans.

As a member of the state's non-point source advisory committee, VCE reports on accomplishments just like all other state agencies. Our state and federal reports are consistent with the State of Virginia reports. The same is true for annual reports of the groundwater protection steering committee.

The Virginia Non-point Source Advisory Committee manages programs designed to quantify, control and limit the effects of non-point source pollution on attainment of water quality standards and goals. Progress towards the achievement of identified goals is reported and monitored annually. Extension is an integral part of the 12-member advisory committee. Total maximum daily loads (TMDLs) and impaired or threatened stream segments as well as market-based strategies are priority items which will be significant components of management strategies during the next four years.

The Virginia Groundwater Protection Steering Committee manages programs to protect and remediate groundwater resources. An annual report of progress is published. Extension has membership on the Steering Committee.

In 1994, Virginia adopted a tributary strategy approach to manage its watersheds on a state/local approach. Extension is a partner in development of the strategy and will be a partner in implementation of the strategy. In January 1997, a tributary strategy was adopted for the Potomac/Shenandoah Basin. The goal of a 40% reduction in nutrients by Year 2000 probably will be met. But, we must maintain that CAP. Strategies are nearing approved for the Rappahannock, York and James Basins. These strategies will have the same goal as the Potomac/Shenandoah basin. Eventually, strategies will be developed and implemented for all basins in Virginia. These strategies are a comprehensive approach to manage both point and non-point sources.

Key program component(s)

Management of nutrients in both urban and rural areas to protect both ground and surface water resources. Animal waste is a major focus of the effort. Homeowner use of fertilizers also is a major program.

Programs to provide community sustainability with respect to environmental issues.

Management of pesticide use in both agriculture and residential areas to protect environmental resources.

Domestic water supply testing and source protection is a major component of the program.

Internal and external linkages

Extension is a team player with local government in achieving success in the water quality arena. In the Shenandoah/Potomac Basin, about 75 percent of the Year 2000 goal of a 40% reduction in nitrogen and phosphorus entering the Bay has been achieved. Local government tributary strategies have been approved for the Potomac/Shenandoah Basin. Tributary strategies are being developed for the York, Rappahannock and James Basins.

Involvement of other Organizations and Agencies:

- Virginia Secretary of Natural Resources
- Virginia Division Soil and Water Conservation
- Virginia Department Environmental Quality
- EPA Chesapeake Bay Program
- Tennessee Valley Authority
- Virginia Department of Health
- Virginia Water Resources Research Center
- Virginia Soil and Water Conservation Districts
- Virginia Department of Agriculture and Consumer Services
- U.S. Natural Resource Conservation Service
- Virginia Farm Bureau
- Regional Planning Districts
- Local Planning Departments
- U.S. Farm Service Agency
- Virginia Department of Forestry
- Virginia Department of Game and Inland Fisheries
- U.S. Army Corp of Engineers

Chesapeake Bay Foundation
 Virginia Marine Science Museum
 Local Watershed Associations
 North American Association of Environmental Education
 Local/Regional Environmental Groups
 Alliance for Chesapeake Bay

Many efforts involve joint projects with local units of government and/or local Soil and Water Conservation Districts.

Target audiences

The audience includes: corn, small grain, livestock and poultry producers; farmers and others who apply pesticides, and specifically those who are required to develop an IPM farm plan by the provisions of the Chesapeake Bay Preservation Act; rural homeowners and other household residents relying on private/individual water supplies; environmentally concerned citizens; and elected/appointed officials, individuals and groups with water quality responsibilities and/or interests. Everybody involved in tributary strategies.

Program duration

A continuous and ongoing program.

Allocated resources

Extension Funding

Year	Federal	State	Local	Other
2000	150,000	400,000	400,000	0.0
2001	150,000	400,000	400,000	0.0
2002	300,000	400,000	400,000	0.0
2003	300,000	400,000	400,000	0.0
2004	300,000	400,000	400,000	0.0

Extension FTE's

Year	Professional			Paraprofessional		
	1862	1890	Other	1862	1890	Other
2000	8.9	0.4	0.0	2.0	0.0	0.0
2001	10.0	0.4	0.0	3.0	0.0	0.0
2002	10.0	0.4	0.0	3.0	0.0	0.0
2003	10.0	0.4	0.0	3.0	0.0	0.0
2004	10.0	0.4	0.0	3.0	0.0	0.0

